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VICE PRESIDENT

PLANT SUPERINTENDENT

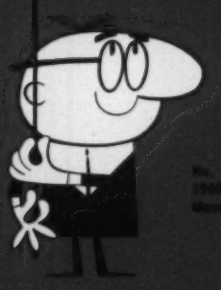
FACTORY MANAGER

TREASURER

CHIEF ENGINEER

PURCHASING DIRECTOR

PRODUCTION EFFICIENCY



No. 4 in STEEL's 1960 Program for Management

How to Organize To Buy Equipment

PAGE 43

FEBRUARY 22, 1960

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

Partial Depreciation Break in Sight

Zero In on Wasted Time; It Offers A Way to Boost Productivity 10%

Superalloy Springs Survive Repeated High Temperature Brazing Operations

Tips on Cutting Your Hand Tool Costs

Graphite Cloth Supplies the Heat, Speeds Stainless Honeycomb Brazing

Plastic Coated Sheet Demand Soars

COMPLETE CONTENTS
TURN PAGE

METALWORKING OUTLOOK
PAGE 23

NEW GIANT AT WORK on Double Diamond Gears

This huge, continuous, carburizing, hardening and draw furnace now permits even greater instrument control in heat treating DOUBLE DIAMONDS for maximum wear resistance and load-carrying capacity. So far as we can discover no more efficient furnace could be installed to achieve the quality characteristics our gear customers have come to expect.

At your request, our gear engineers would be pleased to describe this process in greater detail and to explain, as well, what our recently expanded facilities can mean in terms of this pledge: "DOUBLE DIAMOND Gears offer the advantages of lower installed cost and economical and dependable service on the job . . . gears that do credit to your product and reputation."

EATON

AUTOMOTIVE GEAR DIVISION
MANUFACTURING COMPANY
RICHMOND, INDIANA

GEARS FOR AUTOMOTIVE, FARM EQUIPMENT AND GENERAL INDUSTRIAL APPLICATIONS
GEAR-MAKERS TO LEADING MANUFACTURERS

This Week in STEEL
The Metalworking Weekly

February 22, 1960 Vol. 146 No. 8

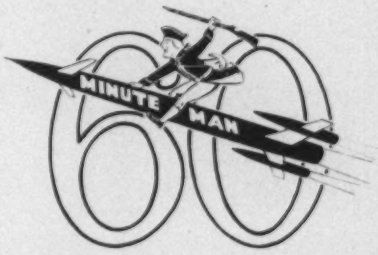
Partial Depreciation Break in Sight

You may be getting a better break on depreciation allowances. Here's why: Treasury Secretary Anderson wants Congress to amend the Internal Revenue Code to treat profits from the sale of depreciable personal property as ordinary income to the extent of the depreciation deduction taken on the property. Such profits have been taxed as capital gains. If the amendment is approved, Treasury promises "to accept more readily taxpayers' judgments and practices on depreciation rates and salvage value."

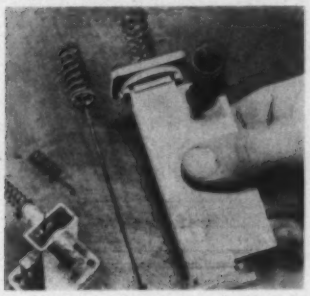
PAGE 33

Cut Wasted Time to Boost Productivity 10%

Check the time being wasted in your company—by whitecollar as well as production workers. If you're typical, 10 per cent of working hours are being lost. Thompson Ramo Wooldridge Inc. officials developed a program aimed at getting a full day's work from its employees for a full day's pay. The symbol represents the theme—Be a "60 Minute Man." PAGE 36



Superalloy Springs Survive High Temperature Brazing



They retain shape and tension after hundreds of dips in 1100 and 1400° F salt baths. Brazing of complex microwave assemblies is simplified, faster, and more precise. Many other applications are possible. The material is Haynes Alloy No. 25, a product of Haynes Stellite Co., a division of Union Carbide Corp. It's being fabricated into spring wire by National-Standard Co. In that form, it is known as NS-25. PAGE 68

How to Cut Your Hand Tool Costs

Outlays for items considered minor, such as hand tools, can mount to astonishing sums—as much as $25,000 a year for a truck assembly plant employing 2000. You can get better value for your money by heeding the tips appearing on. . . . PAGE 70

Graphite Cloth Speeds Stainless Honeycomb Brazing

The material supplies the heat and is used in stainless steel honeycomb brazing. It has joined panels in 9 minutes vs. as much as 23 hours formerly. Now engineers are working on other industrial applications. PAGE 74

Plastic Coated Sheet Demand Soars

Watch plastic coated sheet metal (steel, aluminum, magnesium). Demand for vinyl laminates alone may hit 150 million sq ft this year vs. 40 million last year. That's only a start in a market with an estimated annual potential of 1 billion sq ft. PAGE 103

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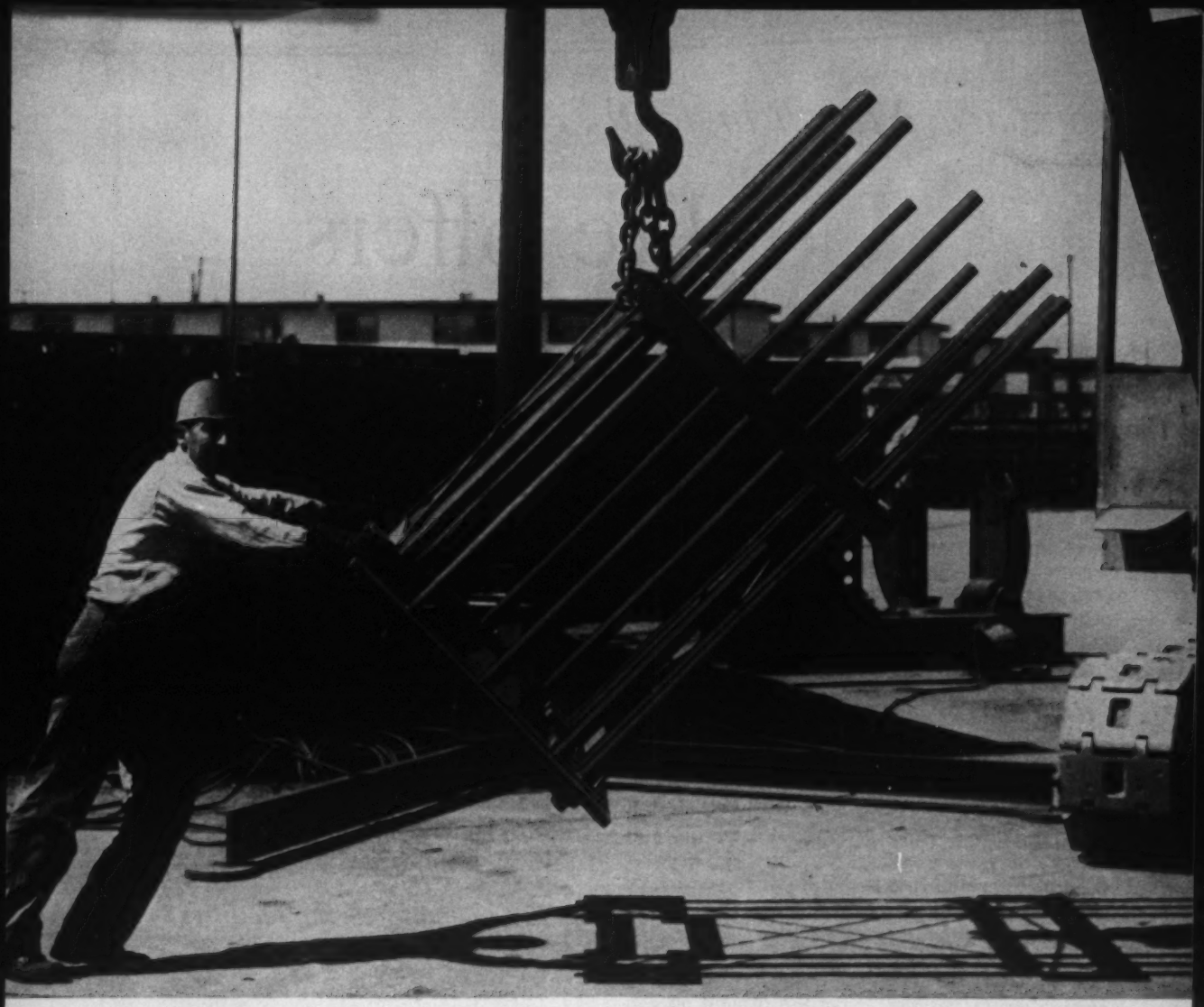
Index available semiannually.

STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.



Big bolts for the Giants' ball park

Threaded foundation bolts, two inches in diameter and eight feet long, 14 of them in all, were welded into this mammoth cage. This section will be embedded in concrete as an anchor for one of several steel shafts supporting the lighting system for the San Francisco Giants' new Candlestick Stadium.

The range of Bethlehem standard fasteners is wide enough to handle most bolting requirements. But quite often a special job, such as this one, calls for a special fastener designed to meet the specific need.

We can make an almost unlimited variety of special fasteners. Just send us a pencil sketch or drawing. Our fastener engineers will study it; and perhaps they can recommend changes that will save you money. We're equipped to give you prompt action. For full details, get in touch with our nearest sales office.

Candlestick Stadium, the new home of the San Francisco Giants

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Forward March in 1960...

Udylite offers new products, processes

MAJOR DEVELOPMENTS IN EVERY PHASE OF THE INDUSTRY COME FROM THE WORLD'S LARGEST PLATING SUPPLIER

Udylite steps up the production of new equipment and processes and continues its expanding program of research and new product development. Here are some of the New benefit-packed innovations that Udylite has ready for you NOW.

New Barrel assembly Just released, Udylok-Tempron Barrel Assembly . . . unique interlocking cylinder construction which permits speedy field repair . . . tie-rod-free construction . . . twelve machine screws the only metal used in cylinder . . . advanced ring gear design with heavy duty, four pitch gearing for greater strength . . . longer life . . . made of non-corrosive Udylon . . . *and* a revolutionary new superstructure design.

New Rectifier line A whole new line . . . completely re-designed from the ground up . . . economies affected with new method of manufacture mean real savings in your original cost . . . keep maintenance and replacement costs minimum . . . fully guaranteed and built to usual high standards of Udylite quality construction.

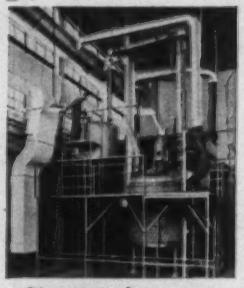
New Tank lining Brand new tank lining . . . for special applications . . . introducing a new recently perfected material of unusual properties . . . an EXCLUSIVE with Udylite.

New Filter series Improved . . . high area . . . low pressure filters . . . designed with economy of operation in mind for you . . . long range savings . . . low, low maintenance costs . . . greatly increased efficiency . . . full range of sizes and capacities.

New Processes due Another great forward step in the battle against corrosion . . . A NEW Udylite bright plate process . . . now under rigorous testing for introduction early in the spring . . . a product of the continuing research and development that gave you "The Incomparable 66" and Bi/NICKEL.

New Automatic Machine features Plating automation . . . equipment advances . . . including new skip mechanism . . . 1960 models of Cyclemaster . . . and the famous Udylite V.I.P., automated barrel plating machine . . . to fit economy budgets.

New manufacturing facilities $600,000.00 expansion program at Udylite, Detroit . . . installation permits quality controlled production of vital raw materials . . . guarantees source of supply . . . provides you with product of insured purity . . . at a reasonable price.



Giant autoclave . . . new plant facility at Udylite

The newest and the best in plating supplies, equipment and processes . . . products such as those shown here flow constantly from Udylite to industry. Watch for detailed announcements every month. If you'd like to learn more about any of the developments we've talked about right away, just get in touch with your Udylite man today or write to:

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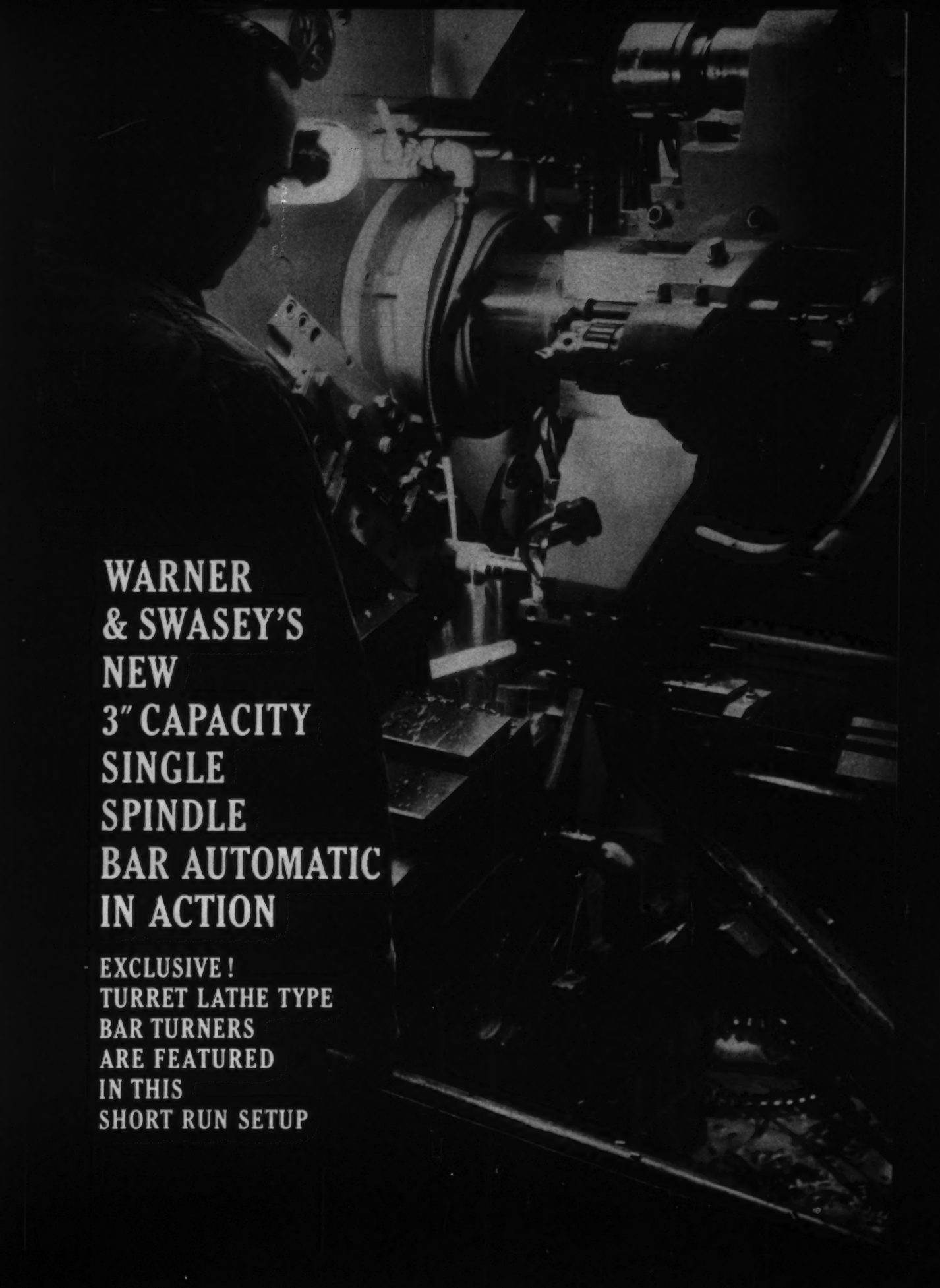
world's largest plating supplier



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TURRET LATHE TYPE
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. . . are a sum total of manual skill, metallurgical technique and technical manufacturing controls. The complete line includes many major roll types, subdivided into distinct analyses to meet a variety of job requirements. *Sales Department, Engineering Department and Mfg. Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.
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Please direct all correspondence to attention of Ed Service, STEEL, 1213 W. Third St., Cleveland 13, Ohio.

February 22, 1960

Word from a Talent Developer

The article, "How to Develop Your Creative Talent," STEEL, Dec. 28, 1959, p. 53, has gone that one step beyond reader interest—it has entered the Usership category. Witness this letter:

"I would like to have a copy of the article . . . Over a period of years, your articles have proved to be a considerable help to me in planning training sessions with supervisors and managers," says W. E. Nelson, training supervisor, Norris Div., Norris-Thermador Corp., Los Angeles.

For more on Usership, and how you can earn $500 or $1000, read the details of our Usership Idea of the Month Contest on Page 6.

The Need for Change . . .

. . . Is ever in the minds of our editors, but action is taken only if a change is for the better. You may have noticed that we switched our Table of Contents from the bow to the stern of the canary colored sheet which is just inside the front cover. The front of that sheet now carries summaries of major articles. In the past, they were run in our Metalworking Outlook section.

If you're still following our moves on the checkerboard, you'll note that we lifted the Metalworking Pulse from the position now occupied by the contents listing, condensed it to three items (Industrial Production Index, U. S. Passenger Car Production, and National Steel Ingot Production), and put it on the bottom of the last page in the Metalworking Outlook.

The concept: It's part of our theory that STEEL's readers are busy people, and we want to get the news to you in an easy-to-read form. Hope you like the changes.

Beer in the Kremlin

Our mail tells us a Russian trade delegation has been dickering for the rights to an Australian vending machine that sells ice cold draft beer. "The customer regulates the amount of suds to his taste," says the manufacturer.

The suds control is a good innovation, but the Russians can have the "bartending" machine. A guy might wet his whistle efficiently, but how could he discuss his troubles with a machine?

An Illinois Reader Speaks

"STEEL's Program for Management—1960 is absolutely terrific!" That testimonial comes from H. A. Sygnator, tool engineering supervisor, Shakeproof Div., Illinois Tool Works, Elgin, Ill.

While not typical (what could equal that) it is a close cousin to the many requests for tearsheets that have piled into our Editorial Service Dept.

Here's No. 4

A short distance from here (Page 43 to be exact), Associate Managing Editor John Morgan comes up with the fourth in the PFM series.

He gives you tips on how to improve the purchase and use of capital equipment by organizing for the job.

John got help for the article from Western Reserve University in Cleveland. A task team of graduate students in its School of Business surveyed 48 diverse companies to learn how they organize for equipment spending.

The team did its survey without revealing the sponsor. That's because we wanted to find out, as a side issue, what business magazines helped the 48 executives most in making buying decisions.

Cross our heart, this is the gospel: STEEL was mentioned 38 per cent of the time as the most helpful. The next most popular publication was mentioned 31 per cent of the time. Five others were mentioned in percentages ranging from 16 to 4.

". . . and after he punctured my sinuses, he told me to wear a hat at all times."

"Now look, Ocklu, we ALL can't be Inca gods."

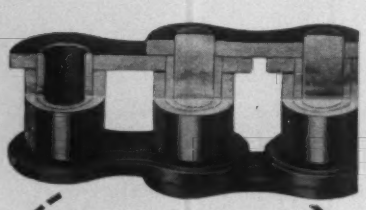
"Waddaya mean, you 'left it under the seat?' Go right back in there and get your hat!"

"Here's your battle-ax, Sir Percival. Now get in there and knock his block off!"

"I told you, 'in Labrador, you pull down the ear flaps, or else.' "

". . . and then, after two years' internship with

MAXIMUM
WEARING SURFACES
for longer chain life



ACME'S SECRET
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Special hardening of pins, bushings and rollers help insure maximum life expectancy of ACME Roller Chains. All parts subjective to articulation have glass-hard wear-resistant surfaces to render eminent life expectancy. The side plates or links which act as connecting members for articulating parts are specially heat treated and tempered to insure great strength and ductility.

Maximum hardening of all wearing surfaces on ACME Chains is conducive to longer life, resulting in greater economy and lower maintenance cost.

Your local distributor has a complete line of ACME Chains and Accessories on hand for immediate delivery. Call him.

Write Dept. 10N for new 100-page Illustrated Catalog, including new engineering section showing diagrams of 36 methods of chain driving.

Acme Chain Corporation
HOLYOKE MASSACHUSETTS

me, we'll send you out to replace old Doc Mambu in the Congo."

Foregoing picture and captions hit our desk (an orange crate) a few days ago, and we were unable to determine the source let alone what the objects were. Finally, we tried viewing them as people talking, and sense began to trickle in.

The mystery was created by our predecessor, one Shrdlu, who now spends his nights punching the Linotype keys in our Press Div. The material had been sent to Shrd and he, in anonymity, passed it along to us.

The Mystery Is Solved

The objects in the photo are permanent mold cast aluminum pistons from Alcoa's Detroit Foundry. The top one still has its gates and risers, and the bottom one is the same piston, rough machined and ready for shipment.

HERE'S HOW YOU CAN WIN

$1000 This Month
in STEEL'S
Usership Idea of the Month Contest

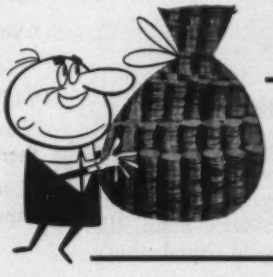
Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—February, 1960) to help you accomplish an important personal or company objective.

Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—

YOU WILL WIN $500

There's more . . . you will win an additional $500 if you submit written proof that you were successful in accomplishing your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

Entries will be judged by a committee of STEEL editors. All letters become the property of STEEL Magazine.



This Month's Deadline
Apr. 1, 1960

Send your entries to:
Ed Service, Servicenter
STEEL
1213 W. Third St., Cleveland 13, Ohio

LET'S TALK WIRE!

These lock washers are typical of many types and sizes of lock washers made from PAGE wire—and lock washers are just one of the many end products for which PAGE manufacturers wire is a logical choice.

Regardless of your use of wire, you can count on PAGE uniformity. Whether you make hairpins or lock washers, PAGE wire will give you the tensile strength, ductility, finish, tolerance and other properties you require.

PAGE facilities are designed to produce a wide range of high quality manufacturers wire items—including special shapes. Where requirements are exacting, you will find PAGE wire unexcelled.

Since 1902, we have pioneered many "firsts" in the wire industry. The latest of these is corrosion-resistant ACCO *Aluminized* Wire—commercially pure aluminum bonded to a steel core.

Why not put PAGE experience and knowledge to work for you to improve your product and lower your costs.

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PAGE —*the source for answers to wire problems*

Republic Reports on OPERATION 375

With a huge increase in capacity just completed, Republic is making another major move . . . spending 375 million dollars *more* for improvement and replacement of present facilities and addition of certain new facilities. Already allocated funds will be spent over the next three to four years. Here is how you will benefit.

"The new $375,000,000 capital expenditure marks our intense emphasis on customer service. In the decade ahead, customers' needs will change even more dramatically than in the past few years. *We will anticipate* those needs."

Charles M. White, *Chairman*

"We will be concentrating on changes, replacements, and additions which will raise efficiency. Raise efficiency and you improve product quality. Improve quality and you *serve customers better.*"

Thomas F. Patton, *President*

"Customers continue to increase the efficiency of their plants with more modern and more costly equipment. OPERATION 375 will enable us to provide the finishes, sizes, and other specifications required by this new equipment."

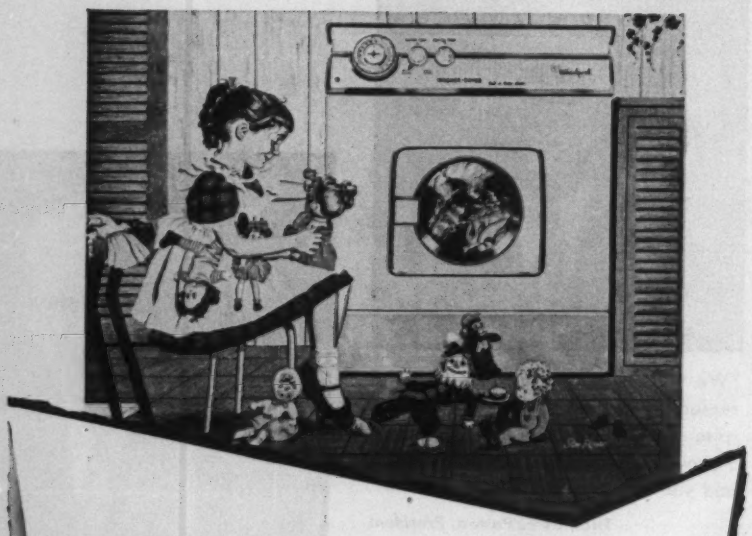
Norman W. Foy
Vice President in Charge of Sales

"Customers will exercise their right to be more demanding. We are building now to meet specifications which are advanced today but which, we are convinced, will become usual among our customers in 5 or 6 years."

Ernest R. Johnson
Vice President in Charge of Operations

REPUBLIC STEEL

World's Widest Range
of Standard Steels and Steel Products



at Whirlpool you'll find...

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Federal automatic resistance welders engineered to give Whirlpool the production they wanted without sacrificing famous Whirlpool quality. Federal welders are integral parts of many of Whirlpool's production lines, helping form and assemble at extra high speeds without breaking stride.

Leading metal fabricators from coast to coast, especially those who require high production and unsurpassed quality, have learned they can depend on the performance of Federal resistance welders and Warco mechanical presses, precision engineered by:

THE FEDERAL MACHINE AND WELDER COMPANY
WARREN, OHIO

Federal® WELDERS

Warco® PRESSES

CALENDAR
OF MEETINGS

Feb. 24-26, American Management Association: Marketing conference, Roosevelt Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y.

Feb. 24-26, American Management Association: Research and development conference, Drake Hotel, Chicago. Association's address: 1515 Broadway, New York 36, N. Y.

Feb. 24-27, National Tool & Die Manufacturers Association: Winter meeting, Roosevelt Hotel, New Orleans. Association's address: 907 Public Square Bldg., Cleveland 13, Ohio. Executive vice president: George S. Eaton.

Feb. 24-Mar. 4, Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy: Penn-Sheraton Hotel, Pittsburgh, Pa. Information: W. J. Feingold, Semiconductor Dept., Westinghouse Electric Corp., Youngwood, Pa.

Mar. 6-9, American Society of Mechanical Engineers: Gas turbine power and hydraulic conference, Rice Hotel, Houston. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Mar. 7-8, Steel Founders' Society of America: Annual meeting, Drake Hotel, Chicago. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Executive vice president: F. Kermit Donaldson.

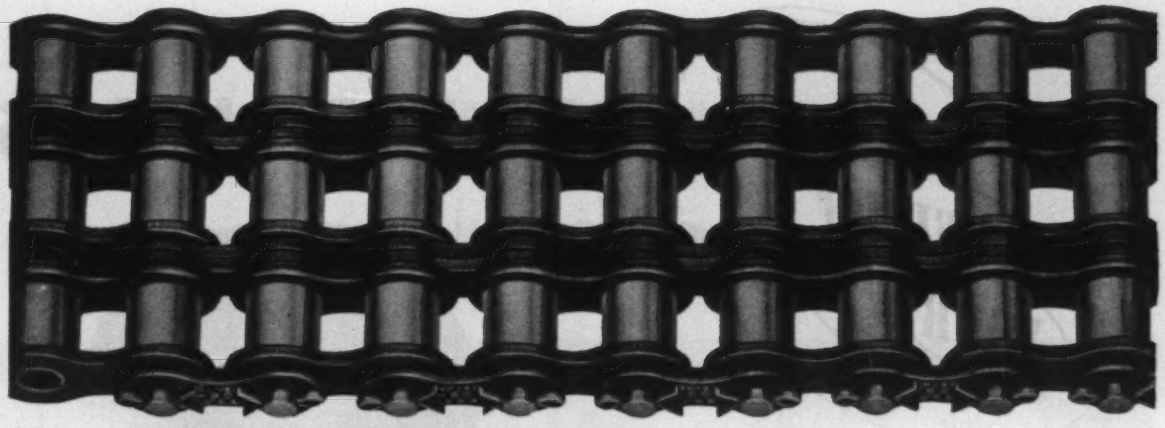
Mar. 7-9, Association of Iron & Steel Engineers: Western meeting, St. Francis Hotel, San Francisco. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managinig director: T. J. Ess.

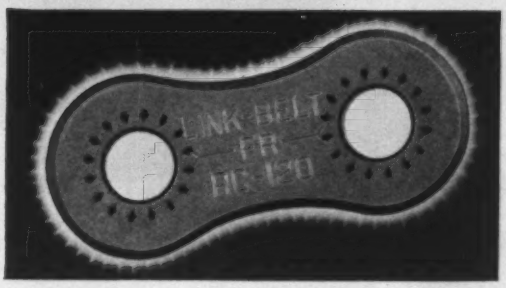
Mar. 13-15, National Association of Waste Material Dealers: Annual meeting, Waldorf-Astoria Hotel, New York. Association's address: 271 Madison Ave., New York 16, N. Y. Administrator: M. J. Mighdoll.

Mar. 14-18, National Association of Corrosion Engineers: National conference and corrosion show, Memorial Auditorium, Dallas. Association's address: 1061 M&M Bldg., Houston 2, Tex. Executive secretary: T. J. Hull.

Mar. 14-18, National Association of Manufacturers: Institute on Industrial Relations, Hollywood Beach Hotel, Hollywood, Fla. Association's address: 2 E. 48th St., New York 17, N. Y. Executive vice president: Charles R. Sligh Jr.

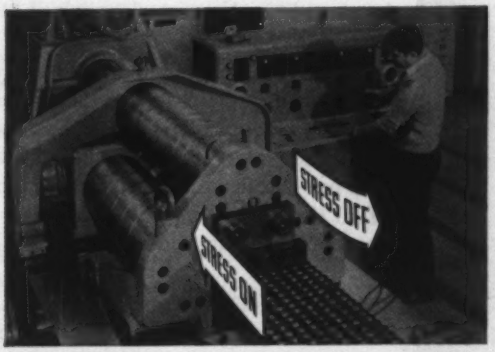
Mar. 15-17, Society of Automotive Engineers Inc.: National automobile meeting, Sheraton-Cadillac Hotel, Detroit. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.





Arrows indicate critical areas treated with compressive stresses to improve fatigue resistance.

Fortified against fatigue



65 TONS OF CYCLIC TENSION! With this equipment—largest of its kind known to be in operation in roller chain testing—Link-Belt tests and rates roller chains. Rapid "stress-on, stress-off" action duplicates operating conditions at a greatly accelerated pace . . . proving over and over that Link-Belt chains are fortified against fatigue.

Link-Belt offers special FR® processed roller chain for applications involving repeated high-tensile loads

Jobs too rugged for standard roller chains are taken in stride by Link-Belt FR roller chain. Through its patented FR process, Link-Belt gives *greater dynamic strength* to the larger sizes of chain most likely to encounter severe cyclic loading. FR greatly raises the chain's endurance limit by compressing metal around pitch holes—the critical sidebar areas most vulnerable to fatigue failure.

The FR process results from the same design and metallurgical research that has produced many more "extras", all *standard* in Link-Belt roller chains. They include shot-peened rollers, close heat-treat control, lock-type bushings and others. For further details on Link-Belt roller chains, send for Book 2657.

LINK-BELT

15,079

ROLLER CHAINS AND SPROCKETS

BOOK 2657 has 154 pages of roller chain data. For your copy, contact your nearest Link-Belt office or authorized stock-carrying distributor. (See CHAINS in the yellow pages of your phone book.)

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.

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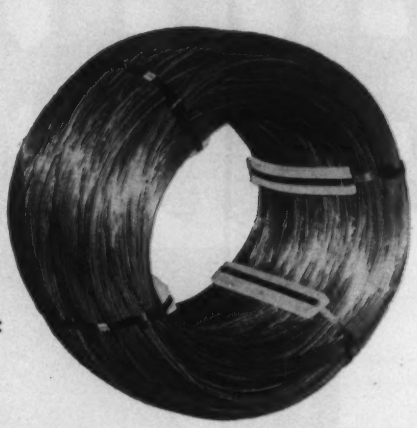
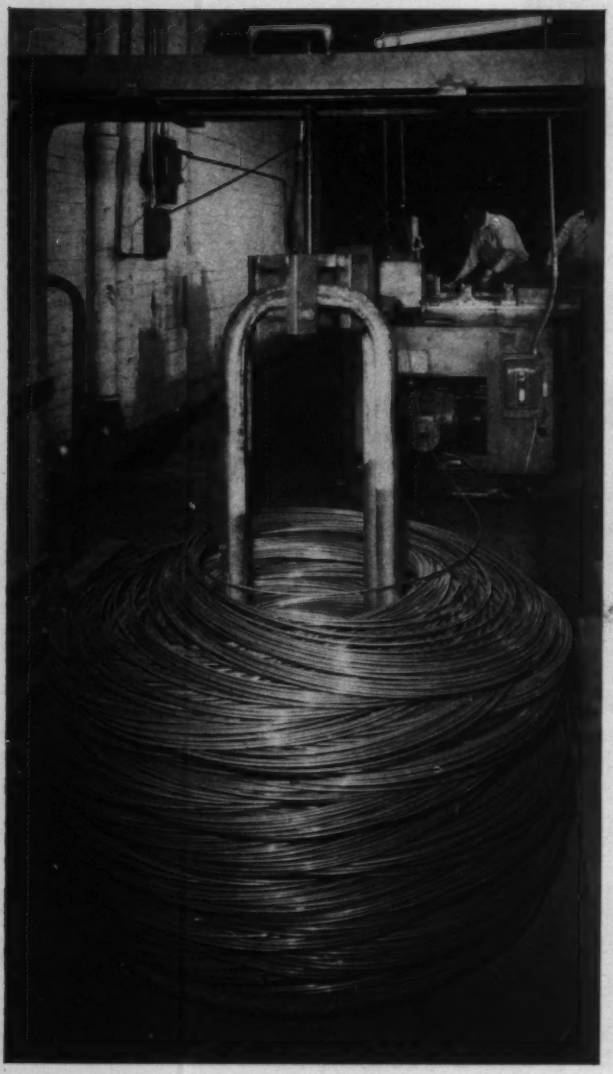


Compact shaped coil ready for shipment



"CF&I shaped coils have saved us 25% in storage, 20% in downtime, have increased our production by over 20%, and have enabled us to produce a higher quality product."—said Mr. Sol Lipshitz, president of Reforce Steel and Wire Corp., Brooklyn, New York.

Problem: "Previously with small coils, we had to stop our machine every 25 minutes to butt-weld the end of a new coil to the used-up coil. As we had to go to this trouble twenty times a day, we were losing 1½ to 2 hours daily in downtime," explained Mr. Lipshitz.

Solution: "A CF&I salesman carefully examined our operation; then he suggested that we use CF&I shaped coils which hold 2500 pounds of continuous length wire, as opposed to 200 or 300 pounds. As a result, we now stop our machine only once to start a new coil, instead of 10 times every day. We save nearly two hours, and have increased production by 20%.

"In addition, CF&I shaped coils have greatly reduced unloading time. Now when we receive a truckload of wire, we unload and store 15 pieces instead of 200. This not only saves time, but freight expenses as well because we now store much more and have to order one-fifth as often."

CF&I heavy coil mounted on spider for pay-off. This heavy coil contains 2500 pounds of continuous length of wire—enough wire for one-half day's production at the Reforce Steel and Wire Corp. "By virtually eliminating downtime with these heavy coils, we have increased production by 20%," said Reforce's president.

CUT DOWNTIME 20%

at Reforce Steel and Wire Corporation, Brooklyn, N. Y.

Heavy coils are quickly and easily placed on a revolving spider. The spider, which is leased from Wickwire, acts like a spool and assures smooth, even pay-off. "Because our machine jerks rather than drawing steadily, the small coils frequently pulled over and became tangled," explained Mr. Lipshitz. "CF&I heavy coils on spiders give us a steady flow of wire and make our operation more uniform."

Here you see some of Reforce's finished reinforcing accessories. "CF&I heavy coils have increased the quality of our product," said Mr. Lipshitz. "Small coils require frequent coil end welding. Sometimes, due to different coil melting temperatures, our automatic welding machine failed to make a good bond, forcing us to re-weld some faulty joints. CF&I long length coils have eliminated this problem."

Choose the CF&I wire package that offers one or more of the following benefits for your production:

- less downtime with extra-long lengths of wire
- quick unloading and easy in-plant handling
- simplified inventory control
- assured cleanliness of the wire

Our salesman will be glad to study your operation and recommend the wire package that will save you time and money. Call the nearest CF&I office today to set up a "no obligation" appointment.

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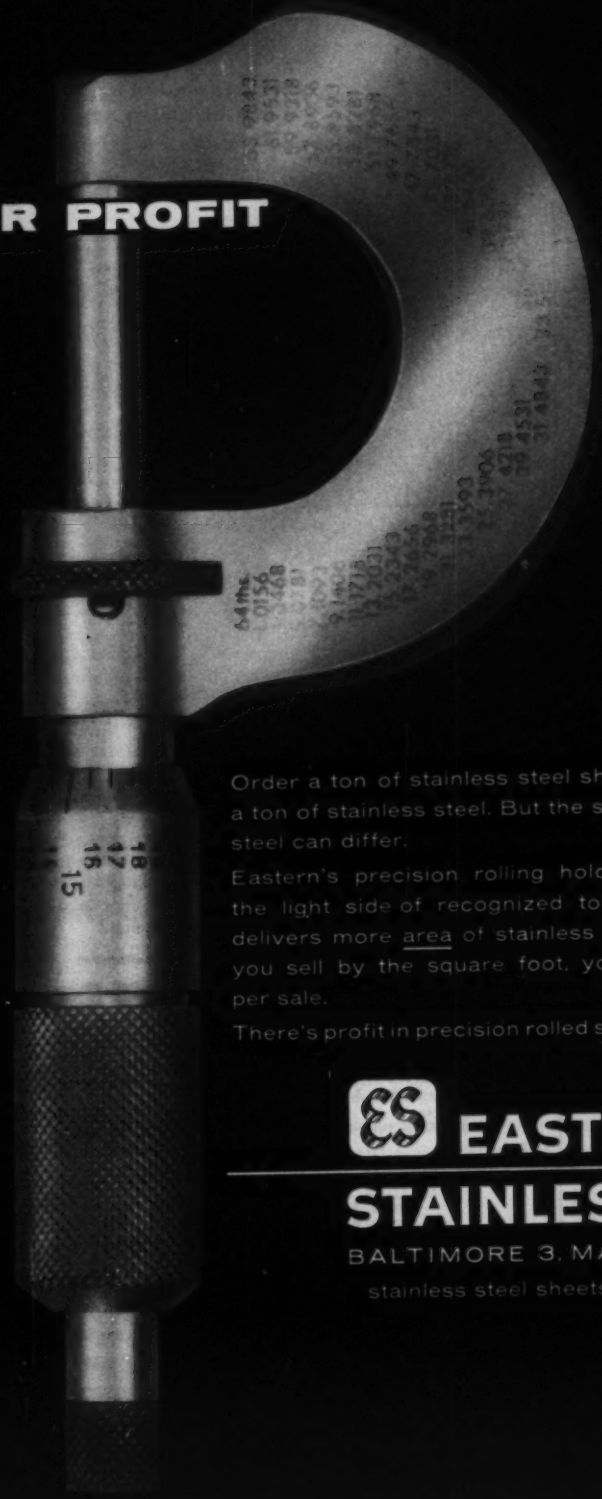

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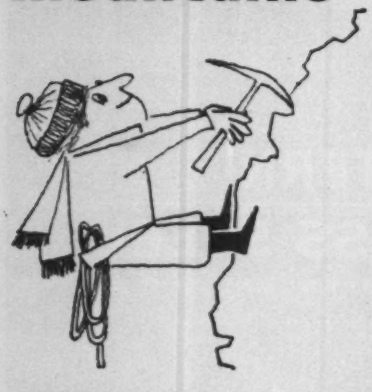
man conquers mountains



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Published Every Monday by
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MAin 1-8260

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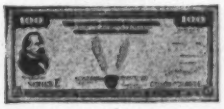
"So what I did was contact our State Savings Bonds Director. He helped us put on a company-wide campaign that reached every employee personally to point out the advantages of buying new 3¼% Savings Bonds, *regularly*. Today we have more than 50% of our people using the plan, and we're going on from there!"

Perhaps *your* organization, too, has been taking your Payroll Savings Plan for granted. It's a great idea, but its value to your people and to your company increases with the number of employees who use it, *every payday*. Let your State Savings Bonds Director show you how easy it is to get your company back in the high value area of participation. Or write Savings Bonds Division, U.S. Treasury Department, Washington, D.C.

ALL U.S. SAVINGS BONDS—OLD OR NEW—EARN ½% MORE THAN BEFORE



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The Metalworking Weekly

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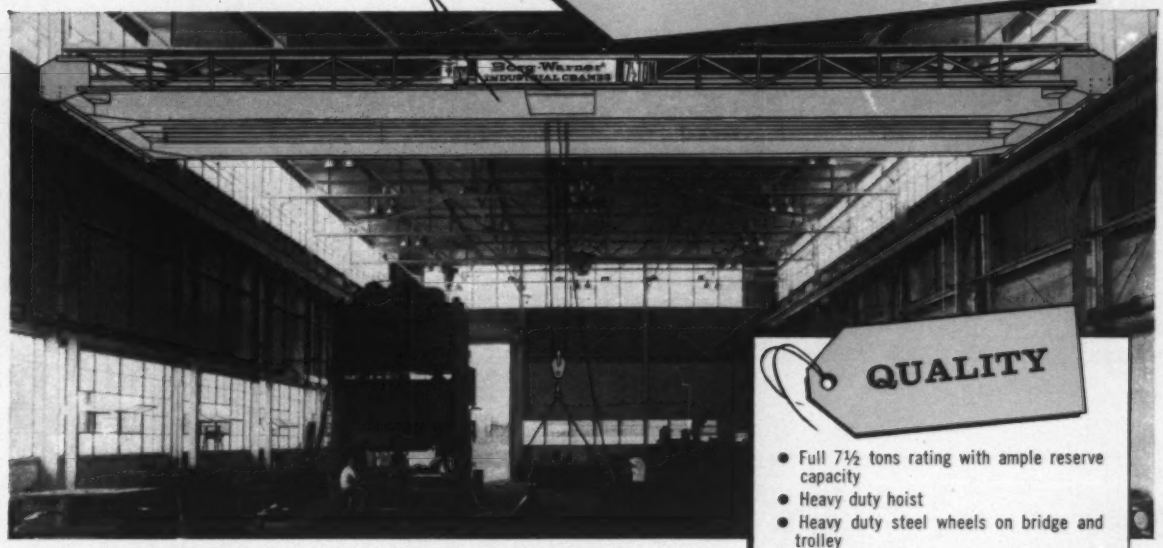
For a 7½-Ton, 60 Ft. Span, 3 Motor, Top-Running Double Girder Industrial Service Crane



QUALITY

- Full 7½ tons rating with ample reserve capacity
- Heavy duty hoist
- Heavy duty steel wheels on bridge and trolley
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- Large gusset plates at end trucks
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- Fluid coupled bridge and trolley drives
- Full magnetic push button control
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MODERN DESIGN

The crane illustrated is a typical double girder installation. For shorter spans, smaller capacities and lighter or intermittent duty Borg-Warner Industrial Cranes can supply your needs at even lower prices.

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Value is determined by QUALITY *and* PRICE . . . and, a price like this for superior Borg-Warner Industrial Cranes construction and performance assures you of top value for your materials handling investment.

If you want to boost your production and operating profits by making full use of overhead space for materials handling . . . if you can use the extra storage space an overhead crane will provide as compared with fork-truck stacking . . . if you can benefit from aisles and work areas cleared of floor-type handling equipment . . . it will pay you to consider a Borg-Warner top-running, motor-driven crane like this. The cost may be far less than you had imagined. One crane owner thought it would cost him nearly four times this price to duplicate his crane.

Borg-Warner Industrial Cranes offers a complete line of overhead cranes . . . for light, medium or heavy service . . . constant or intermittent service at slow, medium or high speeds . . . operation from cab or floor. Get in touch with B-W Industrial Cranes today for answers to your materials handling problems.

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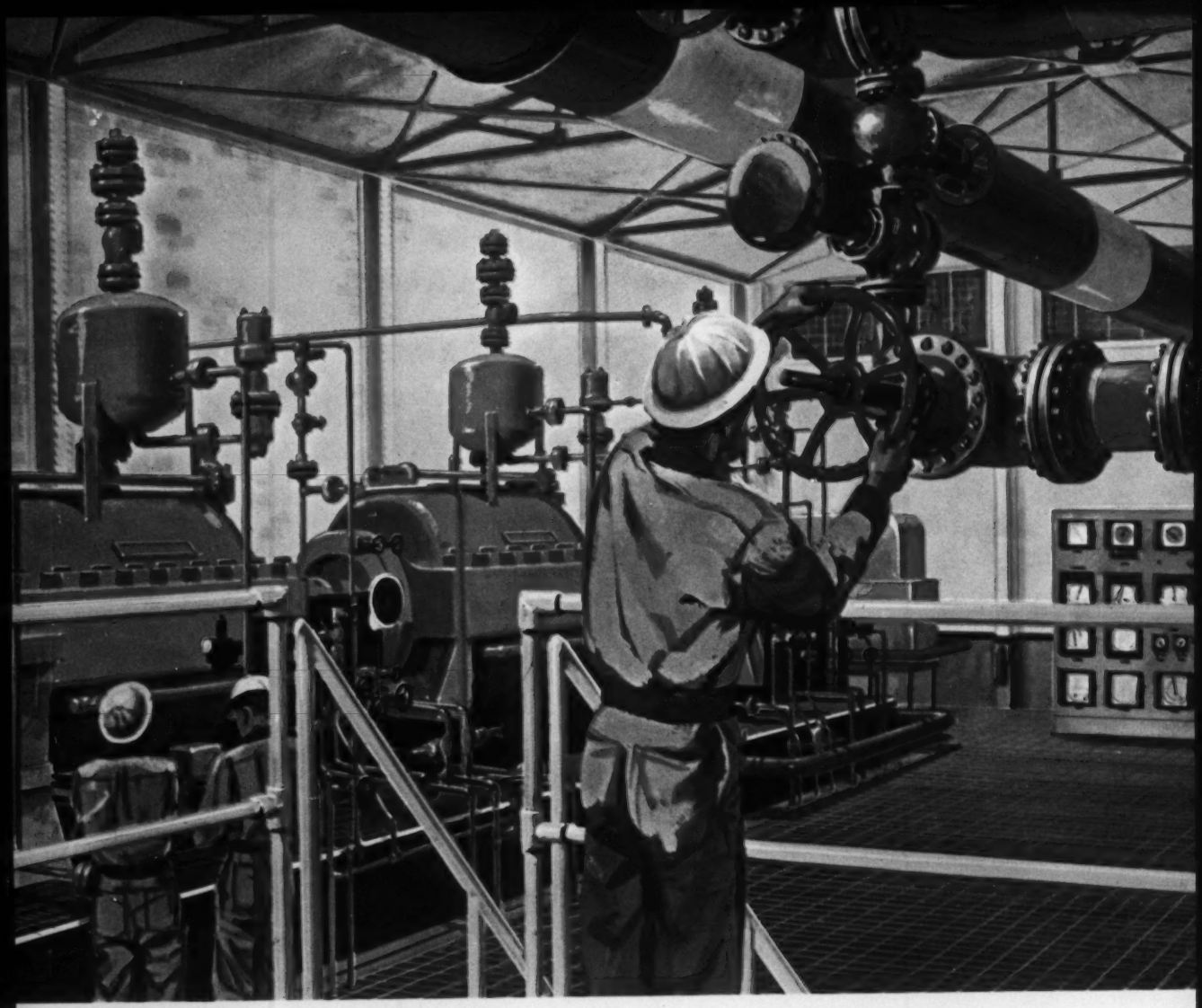

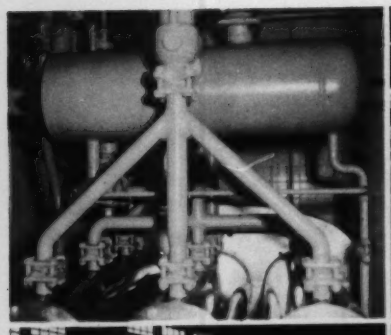

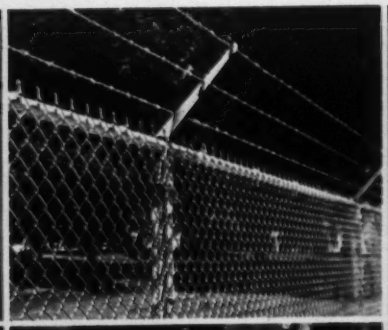

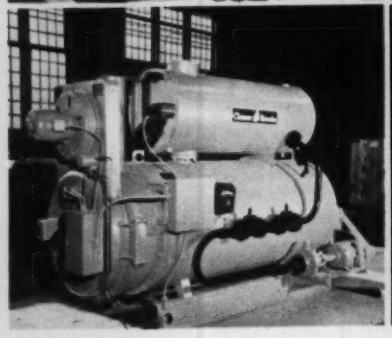

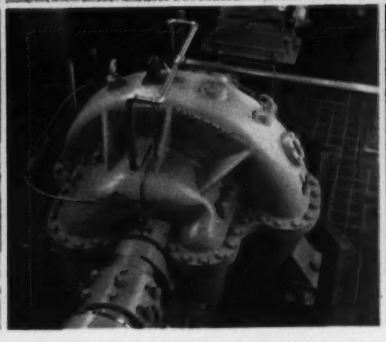

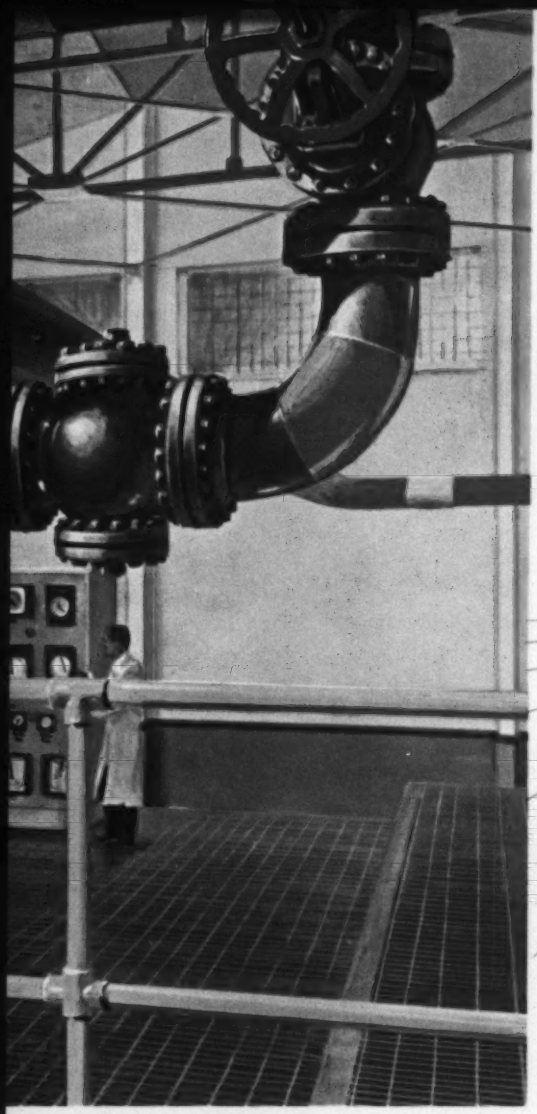

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January Construction Tops $3.7 Billion

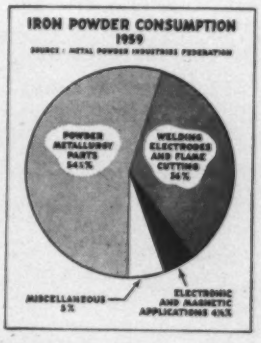
The value of new construction put in place in January was 8 per cent below the December level, but the decline was less than the normal seasonal change for the period. These Commerce Department figures show how the month stacks up with last year's opening period:

(Millions of dollars)

	January 1960	January 1959	% Change
Private Construction	2747	2582	+ 6
Residential buildings	1501	1471	+ 2
Nonresidential buildings	757	655	+16
Farm construction	115	94	+22
Public utilities	352	348	+ 1
Other private	22	14	+57
Public Construction	1000	1130	−12
Residential buildings	61	94	−35
Nonresidential buildings	324	359	−10
Military facilities	94	107	−12
Highways	280	348	−20
Sewers, water systems	113	105	+ 8
Public service enterprises	35	28	+25
Conservation, development	79	73	+ 8
Other Public	14	16	−13
Totals	3747	3712	+ 1

Metal Powder Volume Climbs

Iron powder shipments reached an all-time high (25,000 tons) in 1959, says the Metal Powder Industries Federation. Almost 35,000 tons of powder were consumed compared with 22,500 tons in 1958. Shipments reached second quarter peaks of 3500 tons a month. The manufacture of structural parts accounted for more than half of consumption, reflecting growing usage of powder metallurgy parts in home appliances, business machines, and automobiles. Copper and copper-base powders moved up to new market highs.



Russians Outproduce Western Machine Tool Makers

By using mass production methods, the Russians are beating Western Europe and the U. S. in the production of basic machine tools like automatic lathes, milling machines, and boring mills, reports Seymour Melman, associate professor of industrial engineering at Columbia University, who recently visited Russian plants. He says: Russian factories turn out good quality general

production lathes in 200 manhours vs. 600 in Western Europe; special systems of machine tools, linked by conveyor equipment, are made at the rate of 50 a month; four and six spindle automatic lathes are produced at the rate of one a day; a 27,000 lb horizontal boring mill requires 2000 Russian manhours vs. 10,000 in Western Europe. To meet Soviet competition, says Dr. Melman, industry's methods must be "decisively improved" within only two or three years.

Automakers Trim Production

The year's first broad cutbacks in auto production take effect this week with the closing of Chrysler Corp.'s Imperial plant in Detroit. Many automakers trimmed production earlier by reducing overtime work. When Imperial production resumes next week, 400 of 1700 employees will be laid off. Buick Div., General Motors Corp., will cut back to a 32 hour week at the end of the month at its Flint, Mich., plants. The automakers explain that production so far this year has been scheduled above normal rates to fill depleted dealers' stocks. Now, schedules are being adjusted back to normal.

How to Checkmate Whitecollar Unions

Reid L. Shaw of McKinsey & Co. Inc. suggests a positive employee relations program to keep unions out of the whitecollar staff. It means you must: Pay competitive salaries, benefits. Balance your salary structure fairly between jobs. Offer steady work and layoff protection. Recognize ability in promotion policy but don't ignore seniority. Develop technically skilled supervisors with leadership ability. Inform employees of matters relating to their work. Grant a right of appeal from grievance decisions. Provide good physical working conditions.

U. S. Auto Firms Grab Bigger Import Share

U. S. makes of automobiles produced abroad are taking a bigger portion of the U. S. auto import market. The Business & Defense Services Administration estimates that the European based plants now account for about 28 per cent of the market for imported cars; imports from U. S.-owned plants jumped 224 per cent in 1958 over 1957 volume. Leading importers are Ford in England, General Motors in Germany (Opel), and Chrysler in France (Simca), followed by GM in England (Vauxhall) and Ford in Germany (Taunus). BDSA estimates that imports in 1959 took about 9 per cent of total U. S. auto sales. U. S. exports have fallen steadily since 1955, but still run well ahead of the import trade.

1960 Grads Will Get Early 'Hard Sell'

Expect stiffer competition for college graduates this year. (Industry is expected to hire 19 per cent more than it did last year.) The 202 medium-to-large firms surveyed in Northwestern University's annual Endicott Report on employment prospects for college graduates say they will: 1. Start engi-

neers at about $515, nonengineers at about $424. 2. Sell more "local" colleges more intensively since grads are getting harder to woo away from native regions. 3. Start recruiting programs earlier and try for student commitments by March or April instead of waiting till June.

Dos & Don'ts for College Recruiters

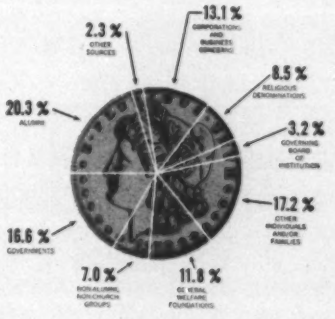
Campus recruiters can do a better job by following several suggestions obtained by the American Management Association from placement officers: Give specific job descriptions; if you're not interested in students below the B level, say so; emphasize broad study background; don't overlook good men who are "different"; don't send poor literature to the campus.

Personnel Department Can Spur Company Growth

Personnel administrators can help their companies plan for change and growth, says Dr. George Odiorne of the University of Michigan's Bureau of Industrial Relations. He points out that personnel experts can improve the climate for innovation by: 1. Using training courses, conferences, and other information channels to improve employee awareness of growth plans. 2. Changing standards for promotion so that men who "make things happen" move up fast. 3. Making salary policies flexible enough to reward the authors of new ideas as well as the men who carry them out. 4. Making obstruction, delay, and inertia in executing new ideas a basis for unfavorable performance ratings. 5. Studying organizational structure to permit maximum freedom for creative innovators.

Where the Educational Dollar Comes From

Business was the fourth largest source of voluntary funds going to American colleges and universities in 1958-59. Council for Financial Aid to Education reports voluntary aid last year totaled $751 million, 21 per cent above the 1956-57 figure. Business gave 13 per cent of the educational dollar. Other big givers: Alumni, 20 per cent; other individuals, 17 per cent; government, 16 per cent.



New Era Opens in Collective Bargaining

A former union official turned business executive declares that traditional wage-price collective bargaining ended with the steel strike. The new approach: Wage-productivity bargaining insisted upon by management. Harold J. Ruttenberg, for ten years the research director of the steelworkers

union, became the president of Stardrill-Keystone Co., Beaver Falls, Pa., in 1951. From now on, he says, increased wages must be tied to increased productivity; it is no longer possible to pass along wage settlements in the form of higher prices without regard to the economics involved. Labor leaders are aware that the era of wage-productivity is here, he says, adding: "The companies couldn't get them to agree to it in the contract, but they know that from here on in they've got to co-operate."

Straws in the Wind

The Federal Reserve Board index of industrial production rose in January to an all-time high of 169 per cent of the 1947-49 average, a gain of 4 points over December . . . The Department of Labor notes a 400,000 decline in union membership from 1956 to 1958. The AFL-CIO admits membership is running at only 39 per cent of its potential . . . Sales of imported cars fell from a June record of 57,000 to 43,800 last month . . . The American Iron & Steel Institute this year will begin issuing quarterly reports on shipments of steel products by geographical destination . . . U. S. auto sales reached 168,000 in the first third of February, 16.7 per cent ahead of the comparable 1959 period . . . Employees of GM's Buick Div. boosted their regular pay by $180,000 last year with awards under GM's suggestion plan . . . Armco Steel Corp., Middletown, Ohio, produced its 100 millionth ton of steel last week.

Here Are Metalworking's Big Gainers

Some metalworking industries grew at a fantastic rate during the last decade; others had only slight gains. The Federal Reserve Board reports these percentage changes in the output of consumer goods from 1947 to 1959:

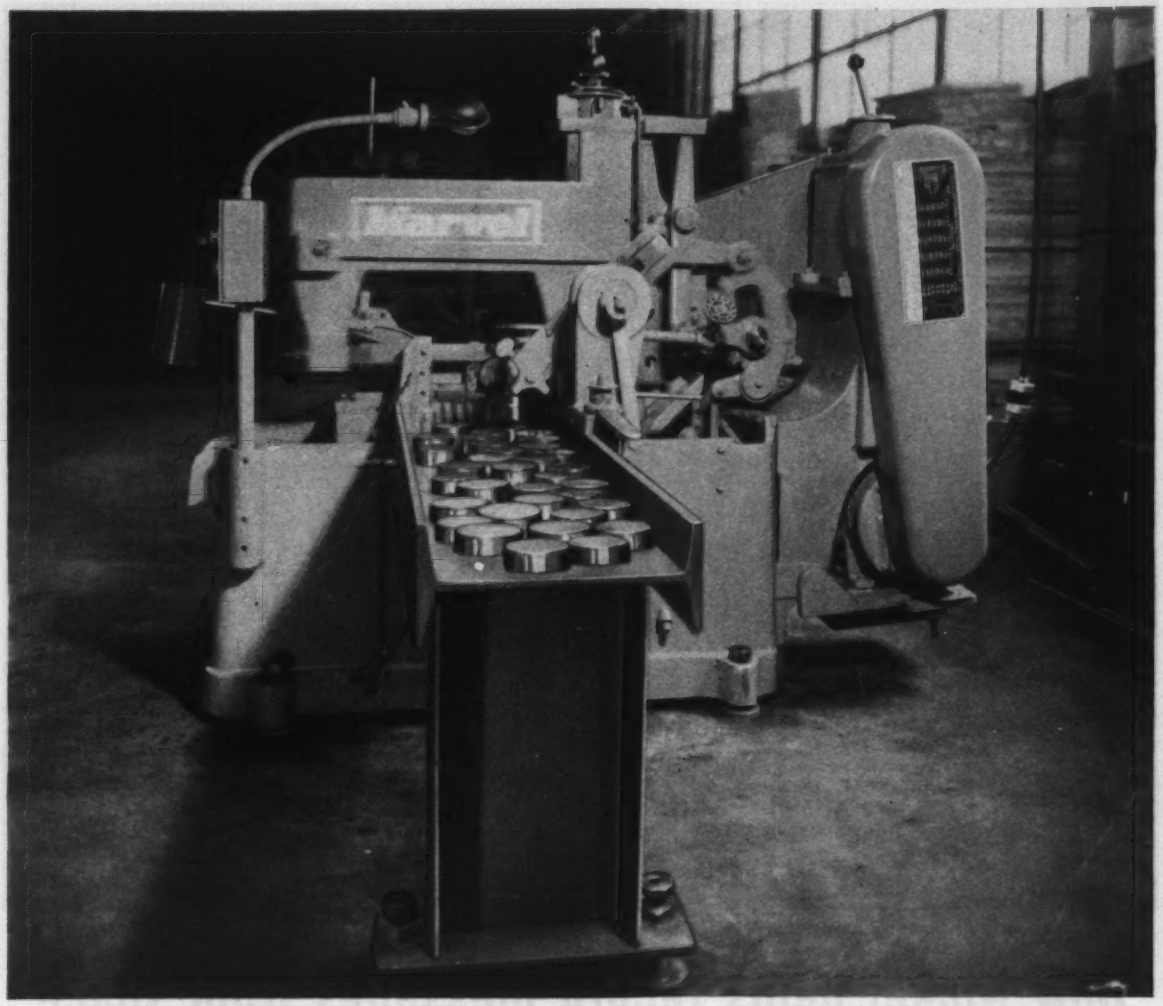
Air conditioners	Up 400%+	Washing machines	Up 63%
Television sets	Up 400%+	Toys and miscellaneous	Up 46%
Clothes dryers	Up 400%+	Refrigerators	Up 46%
Boats	Up 400%+	Jewelry, sporting goods & misc. durables	Up 25%
Home freezers	Up 192%	Vacuum cleaners	Up 24%
Autos	Up 140%	Automotive repair parts	Up 10%
Electric housewares	Up 121%	Average, consumer goods	Up 58%
Household furniture	Up 65%		

Metalworking Pulse

Business Trend: STEEL's industrial production index has declined three consecutive weeks. The preliminary 179 (1947-49=100) is six points below the record set last month. **Autos:** Output has dropped more than 20,000 units since mid-January. Sales were the best last month for any January since '51, but stocks are mounting. Look for further cutbacks. **Steel:** Mills are maintaining ingot production within about 2 per cent of the all-time high.

- **INDUSTRIAL PRODUCTION**
  - Week ended Feb. 13 .... 179†
  - Year ago 162
  - Details on Page 53
- **PASSENGER CAR PRODUCTION**
  - Week ended Feb. 20 .. 152,000*
  - Year ago 120,780
  - Details on Page 50
- **INGOT PRODUCTION RATE**
  - Week ended Feb. 21 .. 94.5%*
  - Week ago 94.3%
  - Details on Page 110

†Preliminary. *Estimated.



Payoff End of a Production Marvel

A cut-off saw's value is proven at the discharge end of the machine. How quickly the trough is filled with accurately cut-off pieces can mean the difference between profit and loss on many jobs.

The R. J. Sudrick Co., Des Plaines, Illinois, manufacturers of precision aircraft components had to cut-off 4600 blanks from 3¼" round, 303 Stainless Steel Bars.

They bought our MARVEL No. 6A4 High Speed Heavy Duty Automatic Bar Feed Hack Saw Machine; used MARVEL High-Speed-Edge Hack Saw Blades, and got the high production, accuracy and economy they desired.

PRODUCTION? Constant at 20 pieces per hour floor to floor

ACCURACY? Held well within the permissible tolerance of +.010 −.000

BLADE COST? Just 1½¢ per cut. Only twenty-three MARVEL blades were needed to make the 4600 cuts, and not a single blade failure due to blade breakage. MARVEL High-Speed-Edge Blades are unbreakable.

The point is this: MARVEL Metal Cutting Hack Saws equipped with MARVEL High-Speed-Edge Hack Saw Blades are an unbeatable combination for economical, accurate and safe cutting-off.

If your hack saws are not producing the economy you need to meet today's competition, try MARVEL High-Speed-Edge Blades. They will give you the competitive edge every time. Write for Catalog C-85 which has the complete story on MARVEL Hack Saws and Band Saws, Hack Saw Blades and Band Saw Blades.

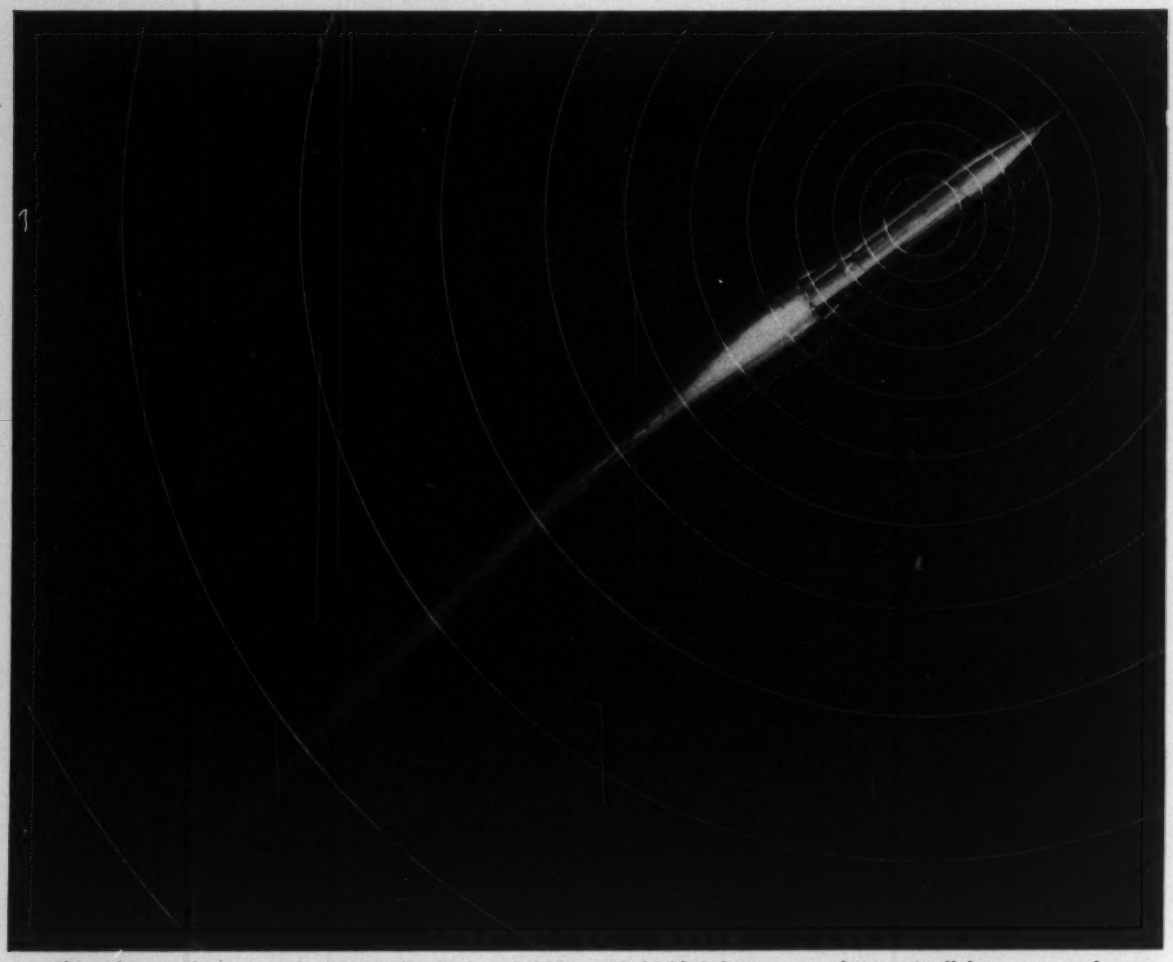
MMT-PE

ARMSTRONG-BLUM MFG. CO.

5700 W. BLOOMINGDALE AVE., CHICAGO 39, ILL.

MARVEL Metal Cutting SAWS

Better Machines-Better Blades



Things happen fast to a rocketing missile. High-nickel Mumetal shields help tape recorders get it all down accurately.

How Nickel helps record messages from space

When a missile rockets off into space, it detects all sorts of data — temperature, radiation, meteoric dust — the many things we need to know in order to conquer space.

Since radio transmission and reception between missile and ground is not always reliable, some missiles carry an airborne secretary—a multi-channeled tape recorder.

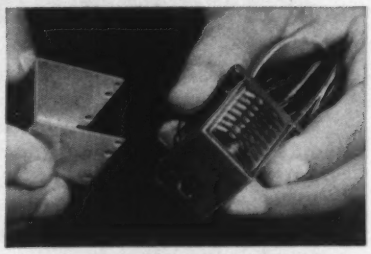
It records as many as thirty different bands of data side by side on a 1½-inch magnetic tape.

Confusion of all the magnetic fields crammed inside the tiny head could cause messages to come out garbled.

But there is a way to keep them straightened out—by using Mumetal* (77% Nickel). This alloy has the unusual ability of soaking up magnetic fields like a sponge. Thin, flat shields of Mumetal siphon off troublesome interference.

The manufacturer also covers the whole head with more Mumetal to bar stray magnetic fields on the outside from getting inside. And then a protective Nickel-chrome plating goes on top of that.

All in all, it's quite a job Nickel does. And something to keep in mind the next time you're faced with a problem in your product or process. If it has to do with high or low temperatures . . . magnetism . . . corrosion . . . fatigue or some other factor, write us. We'd be happy to show you how Nickel, or one of its alloys, may be able to help.



Tiny magnetic head of tape recorder has Mumetal shields to trap magnetic interference, help Davies Lab. Division of Minneapolis-Honeywell pack much in little space. Nickel-chrome plating on cover adds durability, corrosion resistance, and attractive appearance.

*Trademark, Allegheny Ludlum Steel Corporation

The International Nickel Company, Inc.

67 Wall Street INCO New York 5, N. Y.

INCO NICKEL

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

Labor's Dream World!

Reports emanating from the midwinter meeting of the Executive Council of the AFL-CIO in Miami, Fla., indicate that labor management is still living in an economic dream world.

The Council accuses the Eisenhower administration of negative policies which resulted in the 1954 and 1958 recessions and are now generating another one that will arrive in 1961.

In anticipation of the recession, the Council wants Congress to increase unemployment compensation payments.

It wants an end to the tight money policy which it says has squeezed the economy twice in the last decade.

It wants the 4¼ per cent interest ceiling left on government bonds.

It wants higher wages and salaries and new federal legislation raising the present $1 minimum wage.

It wants lower income taxes for the low and middle income groups.

It wants public works programs set up and ready for use at the first sign of a recession.

All the demands are ostensibly for the purpose of promoting economic stability and keeping purchasing power in the hands of consumers.

But labor leaders foster the illusion that such proposals can be met by a bottomless reservoir of profits created by waving a magic wand.

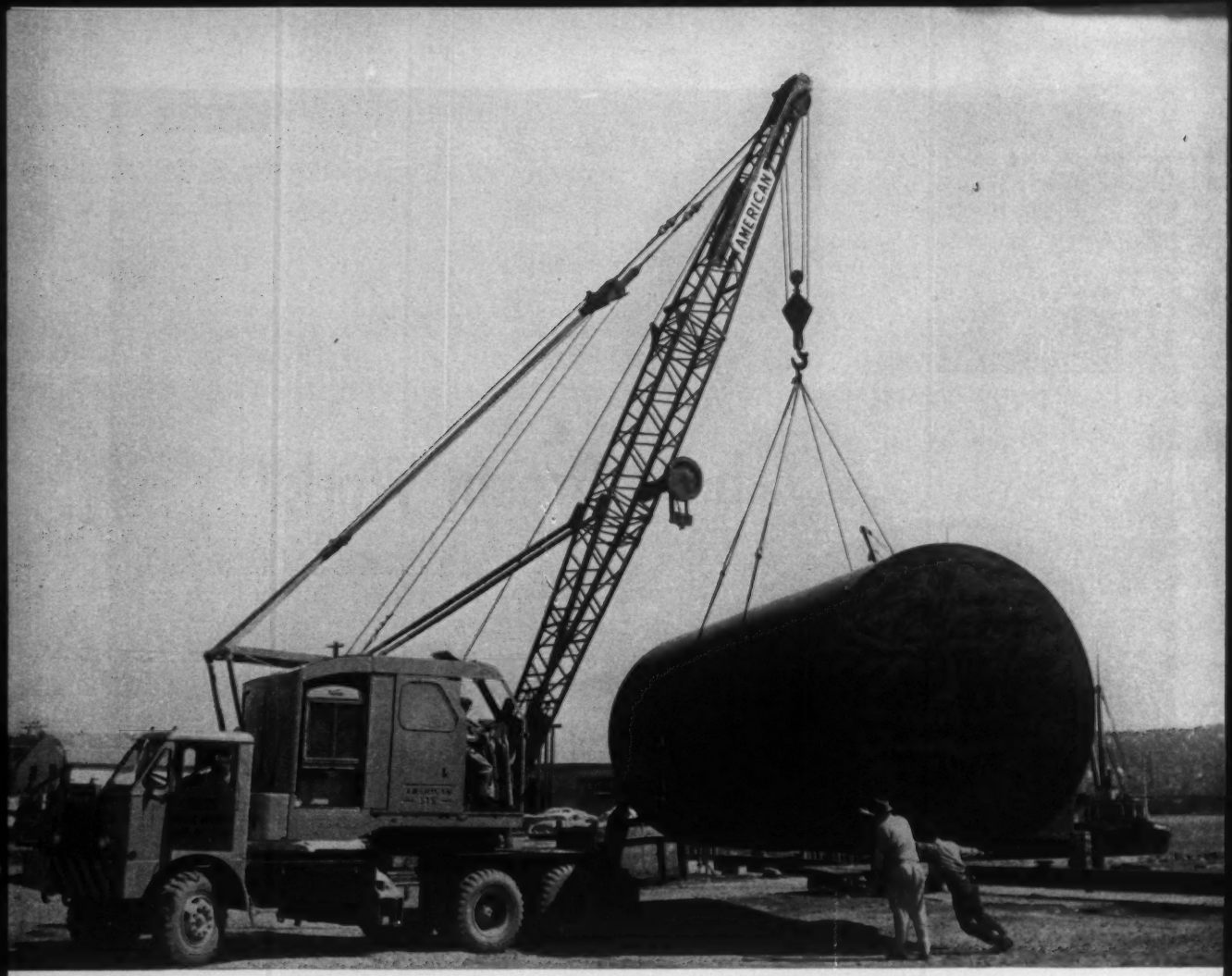
They choose to forget that profits result only from productive work of people in plants and offices.

So more than ever before, management must give working people the true facts about the way higher costs and inefficiency affect their jobs in this rough, tough, competitive, and realistic world.

It is the only way to expose labor's dream world!

Irwin H. Such

EDITOR-IN-CHIEF

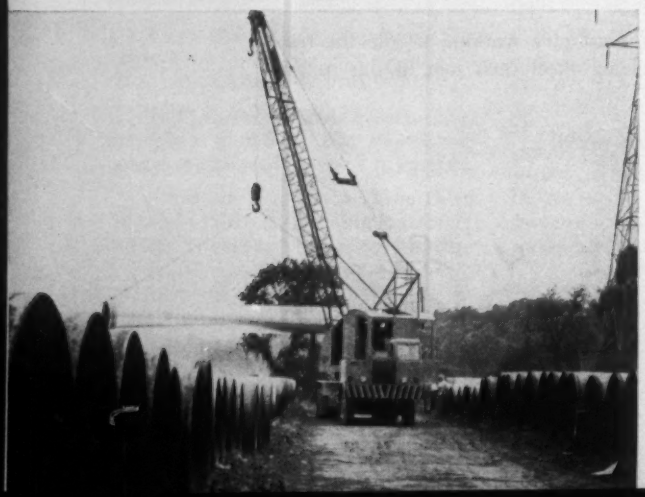


MOVING huge tank with an American 300 Series Truck Crane.

Only American Gives You This Exclusive Line

ON CRAWLERS—ON RUBBER—ON RAIL

Whatever your demands, American Off-Track...On-Track Cranes assure you of top materials handling production

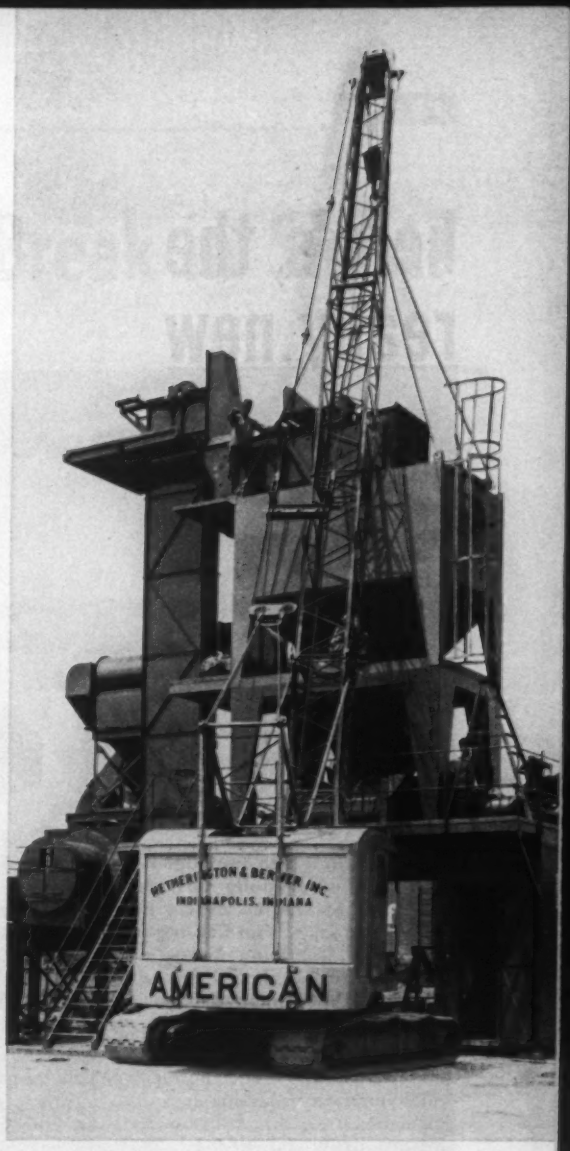


Here is American dependability at its best . . . boosting production on *any* materials handling job.

You can always count on the full line of American Crawlers, Truck and Self-propelled Cranes on the ground—Locomotive Cranes on Rail—to give you maximum effort in every type of work. Serving industry for over three-quarters of a century, American equipment is now better than ever . . . better than *any*. Write us for complete detailed and illustrated catalog information.

HANDLING long sections of pipe in the yard with an American 300 Series Truck Crane.

ASSEMBLY (right) of an asphalt mixing plant with a 300 Series American Crawler.



MANEUVERABILITY in crowded quarters (above) with an American Truck Crane.

HOOK WORK in the yard: American DiesELectric® Locomotive Crane.

AMERICAN HOIST
and Derrick Company
St. Paul 7, Minnesota

CROSBY-LAUGHLIN DIVISION
Drop forged fittings for wire rope-chain

EXCAVATORS-CRANES to 2 yds.-60 tons
LOCOMOTIVE CRANES to 130 tons

DERRICKS-HOISTS to 800 tons
REVOLVER CRANES to 400 tons

here's the really new

Cleveland Worm and Gear

SPEED REDUCER

It was Designed to Provide: High Horsepower in a Smaller Unit • Centrifugally Cast Bronze Gears • Alloy Steel Worms Heat Treated By An Exclusive Process for Carrying Higher Loads • Fan Cooling for More Efficient Operation • Maximum Overhung Load-Carrying Capacity • Ribbed Housing for Maximum Strength and Heat Dissipation • Modern, Streamlined Design to Enhance Your Machine's Appearance.

Cleveland's new speed reducer line meets AGMA Standard 440.03 — which permits higher horsepower and torque ratings — provides you speed reduction at savings of 50% or more on cost per horsepower. All this, with no deviation from Cleveland's standards of quality and dependability.

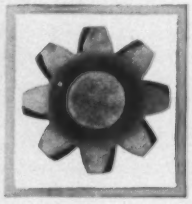
Remember, this strikingly new line of fan-cooled reducers — now available from one to forty horsepower — incorporates all the design knowledge gained by Cleveland's engineers over the past 47 years — plus all the advantages of modern metallurgical techniques and advanced manufacturing processes. Consult your Cleveland Representative for the complete story on this new speed reducer — or write us direct for Bulletin No. 405. It details input horsepower and output torque ratings, service factors, application and load classifications, as well as general over-all dimensions. **The Cleveland Worm & Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.**

A subsidiary of
Eaton Manufacturing Company
Affiliate: The Farval Corporation

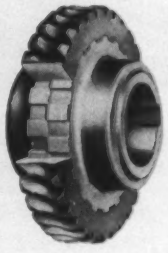
EATON

CLEVELAND
Worm Gear
Speed Reducers

Check these new exclusive Cleveland features



Cleveland's Worm's, heat-treated by an exclusive process, possess a high degree of hardness throughout their entire thread thickness — and well below the worm's root diameter. This gives maximum thread strength and resistance to wear without losing the advantage of a tough core of medium hardness.



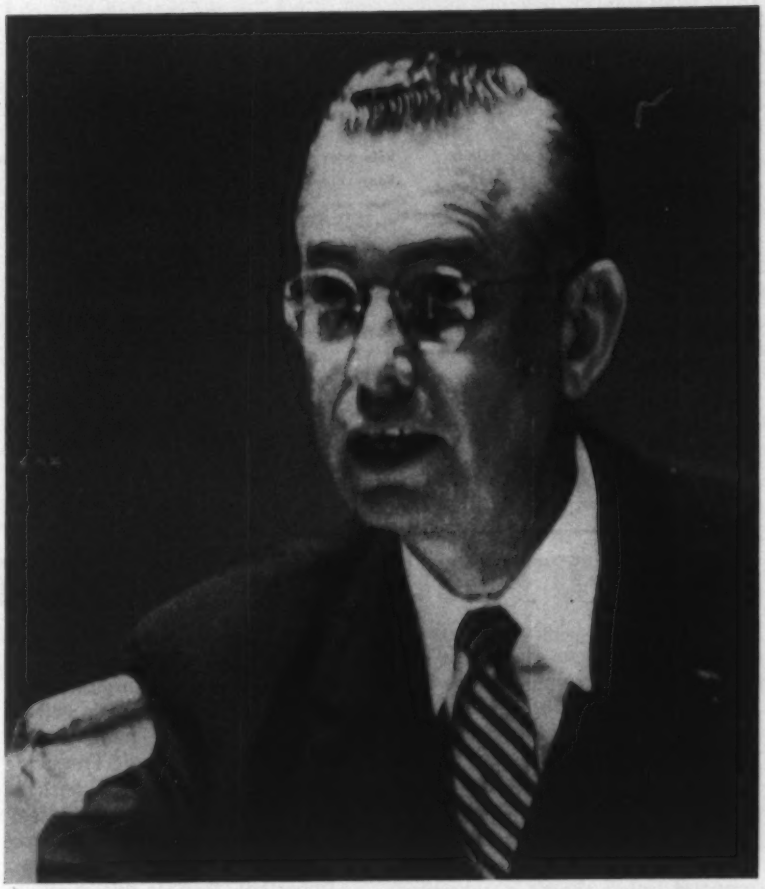
Centrifugal cast bronze rims have a greater density and a higher hardness, giving increased resistance to wear and fatigue pitting. They are centrifugally cast integral with cast iron centers on 6″ and smaller sizes. This permits strong mechanical keying of the two parts — without dependence on actual surface bond. Gear shaft extension diameters are especially large to permit greatly increased overhung load capacity.

Worm and gear shaft bearings are Timken taper roller type, providing adequate thrust and radial capacity. Worm bearings are mounted directly in the housing bore for greater rigidity.

Partial Depreciation Break in Sight?

YOU MAY be getting a better break on corporate depreciation allowances from Internal Revenue agents.

Here's why: Treasury Secretary Robert B. Anderson wants Congress to amend the Internal Revenue Code (Section 1231) to treat profits from the sale of depreciable property, except real estate, as ordinary income at a tax rate of 52 per cent. Such profits have been taxed as capital gains at a 25 per cent rate. If the amendment is approved, Treasury says its agents would be able "to accept more readily taxpayers' judgments and practices on depreciation rates and salvage value."



Treasury Secretary Anderson asks for a depreciation reform

• **Controversy**—If that last implied promise were kept, the net result would benefit industry in spite of the increased tax rate. The more liberal depreciation rates and salvage value estimates would offset the higher tax rate, and the expected decline in haggling with tax agents would bring the net improvement.

But the question is: Will or can the promise be kept? Tax experts whom STEEL checked were skeptical. One says: "Experience has proved that it's hard to get changes of this sort down to the agents' level by administrative action. It takes legislation. We need more tangible assurances."

• **Treasury Rebuttal** — Treasury sources generally discount the skepticism and deny that legislative assurances are needed for more liberal interpretation of depreciation rates and salvage estimates. They think "a good deal of flexibility" can be worked into depreciation negotiations with revenue agents.

Among a group of corporate tax executives meeting in Washington last week, STEEL found at least one who urged support for the Treasury's proposal. His reasoning: Industry doesn't stand a chance of getting anything better at the moment, so it might as well get behind Treasury and hope for the best.

• **Partial Reform** — Even if the Treasury proposal were to work out as well as the most optimistic hope, it would still be only a partial reform. The fight for thorough reform must continue, all industry authorities agree.

President Eisenhower commented on the capital gains question in his budget message last month. Treasury's move is to implement the President's request. Mr. Anderson says: "Sound administration of the depreciation laws has been hampered because informed opinion often differs as to the period of time over which an item of machinery or other depreciable property may reasonably be expected to be useful to the taxpayer in his business." As a result, tax agents have been zealous in insisting upon full proof that depreciation rates and salvage values claimed by a taxpayer can be substantiated by expert opinion or actual experience. Three cases, all involving autos for business use, are now pending before the Supreme Court.

• **Will Congress O.K. It?**—Look for

How Depreciation Proposal Works

SITUATION 1	Present Method	Proposed Method
Machine was purchased for $1000, depreciated to $200, and sold for $500.	Sale Price ..... $500 Book value ..... 200 "Profit" $300	Sale price ..... $500 Book value ..... 200 "Profit" $300
	Tax at capital gains rate	**Tax at ordinary income rate**
	25% x $300 ... $ 75	52% x $300 ... $156
SITUATION 2		
Machine was purchased for $1000, depreciated to $200, and sold for $1100.	Sale price ..... $1100 Book value ..... 200 "Profit" $900	Sale price ..... $1100 Book value ..... 200 "Profit" ..... $ 900
	Tax at capital gains rate	**Tax at ordinary income rate**
	25% x $900 ... $225	52% x $800 ... $416
		Tax at capital gains rate
		25% x $100 ... 25
		Total tax ... $441

Ways & Means Chairman Wilbur Mills (D., Ark.) to accept the administration's recommendations. He reportedly agrees with Treasury that liberalized interpretation of depreciation rates can be accomplished administratively, without need for new laws.

But watch for small business interests on Capitol Hill to fight the proposal unless there's a guarantee of help to small firms. Hearings last summer before the Senate Small Business Committee revealed that little companies are less effective in negotiating with revenue agents than large or even medium sized organizations. Small business proponents would accept the recommendations if they were coupled with other reform measures. An example is S. 2695, introduced last Sept. 12 by Sen. George Smathers (D., Fla.) and others. It calls for the capital gains change but also asks for a triple declining balance method of figuring depreciation, in lieu of the present double rate method.

• **Stalemate?**—Mr. Mills, a powerful man in the area of tax legislation, does not want to get into a thorough and lengthy debate on depreciation in this session which will be short because of the political conventions next summer. If Treasury's proposal can't be passed without getting into such debate, we may end up with no action on depreciation this year.

Important, then, is this comment from an industry taxman: "It behooves us all now to agree on an approach to better depreciation laws so we can make our weight felt when the opportunity for significant changes appears. Perhaps that will be in 1961."

Most Copper Facilities Back in Production

With ratification last week of a new contract at Anaconda Co.'s Montana properties, labor peace in the copper industry was virtually complete. Only the White Pine Copper Co. mines and Phelps Dodge Corp.'s refinery at Laurel Hill, N. Y., were still closed down.

The settlement pattern for the industry was a 22.3 cent package. Kennecott Copper Corp. and American Smelting & Refining Co. contracts run to the summer of 1961; Anaconda and Phelps Dodge go to July 1, 1962.

But the strike which started last August—longest in the history of the industry—leaves some scars. Anaconda, for example, won't reopen some of its Montana mines because they "can't be operated economically under the present costs."

The Copper Institute reported U. S. production in January jumped to 86,491 tons, double the December output and highest monthly total since last July. Deliveries to fabricators rose to 104,678 tons—also the highest since July.

You can expect supplies to remain tight during the next few weeks, but few customers will be in desperate straits. Business will continue brisk during the first half, say copper executives, although perhaps not as good as originally predicted.

Unless the world market gets more bullish, the domestic copper price will stay at 33 cents a pound. Price weakness may appear after that period when overproduction begins to assert itself.

Loan for Indian Aluminum Plant Gets Approval

The Export-Import Bank of Washington has approved a $13.6 million loan to Hindustan Aluminium Corp. Ltd. to purchase U. S. equipment and services to build an aluminum reduction plant in India, reports Samuel C. Waugh, bank president.

Hindustan Aluminium, a joint undertaking by Kaiser Aluminum & Chemical Corp., Oakland, Calif., and the Birla interests in India, will spend over $30 million on the project.

The plant will consist of two units—an alumina installation and a 22,000 ton reduction unit. It will be erected near the Rihand Dam, Uttar Pradesh State, close to bauxite deposits.

Kaiser will train technical employees and provide technical assistance after production is started during 1962.

Detroit Steel, Portsmouth Merge; Alan Wood Expands

LAST WEEK, two more companies joined the ranks of steelmakers that have taken major steps to strengthen their operations for the competitive sixties. Detroit Steel Corp. will absorb Portsmouth Corp. in a stock deal. Alan Wood Steel Co. has launched a $36 million expansion program.

The Detroit Steel-Portsmouth transaction also returns Cyrus Eaton, colorful Cleveland financier, to the steel business. In earlier years, he was responsible for combining several small companies to form Republic Steel Corp.

Mr. Eaton will become chairman of Detroit Steel. He founded the Portsmouth Steel Corp. in 1946 to purchase the Portsmouth, Ohio, plant of Wheeling Steel Corp. He sold the facilities to Detroit Steel in 1949 and Portsmouth Corp. became an investment firm.

The transaction adds about $45 million to the assets of Detroit Steel. Another major factor: Portsmouth holdings include 17 per cent of the common shares of Cleveland-Cliffs Iron Co. Max J. Zivian, Detroit Steel's president, recently outlined a $75 million expansion program covering the next five years which will boost the firm's capacity from 900,000 to 1.8 million tons.

Alan Wood's expenditure covers a two year period and is the first step in a ten year program, Harleston R. Wood, president, reports. The $36 million will be used to build a new blooming mill and plate mill. They will replace facilities which will be dismantled to make room for future expansion. Present facilities will continue to operate until the new mills are completed.

The blooming mill will be a 40 in., high lift mill capable of rolling slabs up to 54 in. wide. The new plate mill will include three stands to roll plates up to 96 in. wide (sheared width). It will have a connected horsepower of 17,500 compared with 5000 hp of the present plate mill.

Blooming mill equipment has been ordered from Birdsboro Corp. and the plate mill machinery from Mesta Machine Co.

The new building to house the two mills will contain 261,000 sq ft of floor space.

The expansion of rolling facilities will eventually necessitate additional melting capacity at Alan Wood. That will come under the second phase of the ten year program.

Two Mergers Draw Antitrust Fire

THE JUSTICE DEPARTMENT has filed a civil antitrust suit against Stran-Steel Corp., Detroit. Reason: Its acquisition of 75 per cent of the stock of Metallic Building Co., Houston.

Stran-Steel, a subsidiary of National Steel Corp., Pittsburgh, is described by the government as "one of the leading manufacturers of prefabricated metal buildings in the U. S." Metallic Building was said to have a "leading position in the manufacture and sale of prefabricated metal buildings" in the Southwest prior to the stock purchase in January, 1959.

Stran-Steel's sales exceeded $15 million in 1958, and Metallic Building's were more than $7 million.

The Justice Department charges that the acquisition may have the effect of substantially lessening competition, or creating a tendency to monopoly in these ways:

1. Competition between Stran-Steel and Metallic Building is eliminated. 2. Metallic Building is no longer an independent competitive factor. 3. Industry concentration has been increased. 4. Stran-Steel's competitive advantage over the rest of industry has increased. 5. Steelmakers who compete against National Steel may be "foreclosed" from selling steel to Metallic Building.

Robert A. Bicks, acting assistant attorney general and head of Justice's Antitrust Division, comments: "The growing trend of large integrated corporations acquiring successful independents is exemplified by this acquisition." He warns that steelmakers will not be allowed to move into this "comparatively young and growing" prefabricated metal building industry.

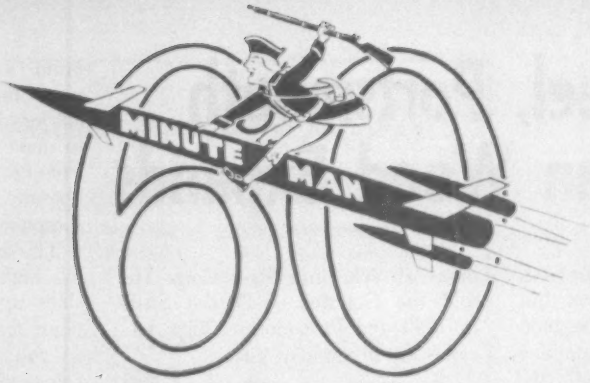
Reynolds Must Sell Arrow

The Federal Trade Commission has ordered Reynolds Metals Co., Richmond, Va., to sell Arrow Brands Inc., Long Beach, Calif., a maker of decorative aluminum foil for the florist trade. Reynolds purchased the firm in 1956.

The acquisition was ruled illegal under Section 7 of the Clayton Act. The FTC ruled: 1. That its effect "was to substantially lessen competition" in the production and sale of florist's foil. 2. That Arrow's prices were cut below cost or so close to cost between October, 1957, and mid-1958 that many competitors were practically forced out of the field.

"We plan to contest the action," says Gustav B. Margraf, Reynolds' vice president and general solicitor, adding: "What it boils down to is that no firm with large resources may hereafter acquire a company in a field where there are many small companies, regardless of the benefits to the consumer. We are convinced the decision is wrong." He says that Arrow prices were lowered to meet "intense foreign competition" and that domestic firms failed to match product improvements and new products developed by Arrow since the Reynolds' acquisition.

"We know of no company forced out of business by the acquisition," concludes Mr. Margraf. "In fact, two new companies have entered the field."



Minute Saved Is Production Earned

YOU CAN BOOST your plant's productivity 10 per cent, and your major cost will be only time and effort. Chances are you'll find that 10 per cent figure too conservative.

Make these simple checks tomorrow (office as well as factory) and the potential for productivity improvement will be obvious:

- What time does production really begin—at the 8 a.m. starting time or some 10 to 15 minutes later?
- At the coffee breaks, rest and lunch periods, do employees continue to work at a normal pace right up to the bell—or do they begin tapering off in anticipation of the break? Is work resumed immediately after the period officially ends—or do another 5 to 10 minutes elapse before a normal tempo returns?

• **Look at the Costs**—The mathematics are simple, but impressive. With two coffee or rest periods per day, you have eight starting and stopping times to work on. If each employee wastes 6 minutes at each, that's 48 minutes per day. Multiply that by the number of workers you have and you'll see the manhours involved.

Or calculate it this way: Those 48 minutes represent 10 per cent of an 8 hour working day for which you're paying wages and salaries.

That kind of mental exercise by Ray S. Livingstone, vice president-human relations for Thompson Ramo Wooldridge Inc., led to the firm's "60 Minute Man" program. The objective: Encourage every employee to put in a full day's work for a full day's pay.

"It struck me forcibly," relates Mr. Livingstone, "that this was part of the job of a personnel manager. It seems to me that one of the principal functions of the personnel executive is to find and utilize the keys that will cause the effective release human energy on the job.

• **Workers Are People**—"It's a rare employee who has no pride," Mr. Livingstone emphasizes, "and there's an element of fairness in everybody. Another important characteristic of employees is their desire to know why."

The TRW executive's interest in competitive sports gave him the concept of the "60 Minute Man" program. "In sports, if you say an athlete is a 60 minute man, that's the highest compliment you can pay him," he relates. "It suggests his giving his all from the beginning of the game clear through to the end."

TRW was also in a good position to explain the "why" of such a program—the time was early 1958 when business was on a downtrend which necessitated laying off employees.

First step in launching the program was a letter signed by J. D. Wright, TRW's chairman and chief executive officer. Emphasis in the letter was that even during a business decline it was possible to gain a bigger share of a market if costs could be cut to permit the company to compete better pricewise.

• **Start at the Top**—Formal presentations of the program were then made—first at the central policy group level and then to division managers, their staffs, and finally to department and first line supervisors who explained the program to their workers.

Two basic goals were outlined:

1. To gain, at the first presentation of the plan, the maximum voluntary employee acceptance.
2. To develop, on a divisional or staff department basis, a program of management planning, administration, and leadership to help employees best utilize their working time.

A poster campaign followed highlighting headlines like these: "Everyone Respects a 60 Minute Man," and "When You Knock Off Early, You K.O. Production." Then foremen began contacting employees individually to get their reactions and suggestions on how the program might be made effective in their respective departments. Each issue of the plant employee newspaper carried pictures and stories of examples of how the program was being applied to cut wasted time.

• **Bring in Worker Ideas**—To give the program additional momentum after the poster campaign was completed, a contest was launched for employees to contribute additional poster ideas. Prizes included a vacation trip, bicycles, television sets, and other merchandise. In a 30 day period, some 1400 ideas were submitted. Typical were: "Don't be a minute moocher" and "Does your weekend start on company time?"

"We feel the program was highly successful," comments C. W. Robinson, personnel manager. "Of course,

Managers Should Also Be '60 Minute Men'

It's Easy to Waste an Hour a Day

By arriving at your plant late	5 minutes
By stopping in the corridor to chat about last night's basketball game or golf	5 minutes
By glancing through the morning newspaper (you should have done it at home)	10 minutes
By taking 15 minutes instead of the official 10 for both coffee breaks	10 minutes
By spending 10 minutes arranging to meet the fellows for lunch (nonbusiness date). Then straggling back 10 minutes late.	20 minutes
By quitting work early to confirm a social engagement, clean up, and leave a minute early to beat the rush	10 minutes

it's difficult to measure specific dollar savings but, coincident with the program, rising costs in many areas were checked; in many instances significant cost reductions were effected. One division which had been making a profit of 4 per cent before taxes was able to increase the figure to 16 per cent by the time the program was finished.

"All of the savings can't be attributed exclusively to the '60 Minute Man' program, but we are sure that it created a cost-consciousness and time-saving climate in which our foremen could stimulate employees."

R. E. Cummings, vice president and general manager of Thompson Products Valve Div., points to another indicator of the program's success.

The valve division's electricity usage is plotted continuously on a graph. Comparisons of load peaks at each of the eight starting-quitting times showed that peaks were reached more quickly at starting times and maintained closer to the quitting times than before.

• **Keep the Ball Rolling**—The one big shortcoming of many improvement programs is that they tend to lose their steam after a few months. TRW's program is now two years old and officials believe that most of the momentum continues.

"One reason," says J. D. Collings, personnel manager of the valve division, "is that the '60 Minute Man' theme is a good working tool for the first line supervisors to approach often tender situations. It's one thing to catch a worker at the time clock 5 minutes ahead of quitting time and accuse him of goofing off. It's another to be able to walk up and ask him what happened to the 60 Minute Men."

Before an individual is hired for a job, two factors are agreed upon: 1. The company promises to provide him a full day's work at a fair wage. 2. In return, the worker promises to put in a full day's work. (TRW executives say that 99 per cent of the workers will do it if approached in the right way.)

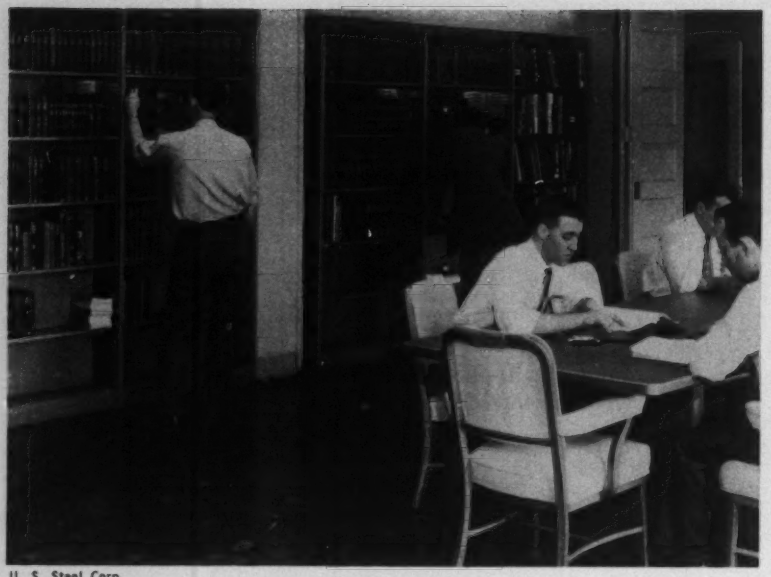
Study Lauds Older Worker

Long standing prejudice against hiring older officeworkers because of low productivity is challenged by a new Labor Department study.

It brought out three important facts: 1. The difference in output per manhour between workers of different age groups is insignificant. 2. Relative performance within age groups shows that more workers in the older age groups exceed the performance of the average workers in the younger groups. 3. Older workers have a steadier rate of output, with less variation from week to week than their younger counterparts.

Experience appears to be major factor influencing average performance among age groups. Example: Average output per manhour was about 7 per cent less for officeworkers under 25 than the next older groups.

Studies show too that older workers have lower rates of absenteeism and turnover.



U. S. Steel Corp.

Use a Library to Keep Pace

THE COMPANY LIBRARY is fast coming into its own as a competitive tool. It is being used to keep abreast of technological advances.

In the last ten years, industrial libraries have tripled in number—to more than 3200. Some notable ones include:

• Bell Telephone Laboratories is said to have the country's largest facilities. Its 12 libraries have more than 100,000 volumes. Last year, they indexed 40,000 technical and scientific articles from periodicals, and some 6000 pages of text were translated.

• General Electric Co. has 35 libraries at the division level.

Steel companies have more than 100 libraries. U. S. Steel Corp. has 15. Bethlehem Steel Co.'s Schwab Library has 15,000 books and regularly receives 800 periodicals.

International Nickel Co. has a library in New York that has 5000 volumes, principally on metallurgy. Union Carbide Corp. has 17 technical libraries throughout the country.

• **When It's Needed**—Significantly, a company library is seldom abandoned once it's installed. Officials emphasize that during periods of business declines, the library becomes even more important as a research and development tool.

Most industrial libraries are relatively small and tailored to the company's needs for business, economic, engineering, and scientific information. Source materials include books, newspapers, magazines, periodicals, government reports, business and professional association papers.

Company librarians point out that firms have a modest collection of books, pamphlets, and other material scattered among its departments and offices. They are the nucleus of a good library.

• **Where to Go for Help**—One organization is the Special Libraries Association (SLA), New York, which has chapters in many sections of the country. Each chapter has a consultation service committee of professional librarians. Companies needing assistance may choose a librarian from a roster of consultants who have experience in specific fields.

Experts emphasize these key factors in setting up your own library (say your initial goal is about 1000 books):

1. A room about 20 by 35 ft. It should be close to the departments it is serving, quiet, and well lighted.
2. Check the flooring supports—stacked books are heavy.
3. Initial layout should include four reading tables, file cabinets, magazine racks, and office space for the librarian.
4. Costs will vary, but experienced libraries indicate that at least $10,000 (exclusive of overhead and salaries) will be required.
5. You can expect to budget about $3000 a year for operating the library, exclusive of overhead and salaries.

• **It's Never Big Enough**—Company executives also point out that an industrial library never seems to have enough space. That's why practically all companies maintain close liaison with librarians at associations, universities and colleges, other companies, and research organizations.

In some communities, libraries of several organizations and firms work together in the acquisition of material to avoid duplication. Savings in money and space result. It's also wise to maintain cordial relations with the special division of public libraries.

Steel Foundries Look For Sales Gain in '60

Larger capital appropriations will contribute to an expected 10 per cent increase in steel casting production this year, predicts F. Kermit Donaldson, executive vice president, Steel Founders' Society of America. Last year's production is estimated at 1.4 million tons.

SFSA represents foundries producing about 90 per cent of steel castings sold in the U. S. and Canada. Members see no radical changes in their established markets, which break down this way:

Industry	%
Railroads	36
Roadbuilding & Construction Machinery	13
Mining & Crushing Machinery	5
Rolling Mills	10
Valves & Accessories	6
Miscellaneous Machinery	13
Military	5
Motor Vehicle (heavy trucks)	4
Other	8

Metal Furniture to Double in '60s

CHANCES are 4 to 1 that, if you are reading this at your desk, it's a metal desk. Better odds: You drank your breakfast coffee at a metal dinette table and sat in a metal chair. And next summer, your wife probably will set up her lightweight aluminum patio furniture for an afternoon of bridge.

Those are examples of a market which you may be overlooking—a market that is about doubling every ten years and will reach $1.2 billion by 1970. (See details in table at right.)

Manufacturers' Shipments in Millions

	1970	1960	1959	1957	1947
Office	$730.0	$325.0	$310.0	$296.7	$125.7
Summer, Casual	248.0	164.0	149.0	145.0	36.0
Dinette	222.0	147.5	134.0	143.0	60.0
TOTALS	$1,200.0	$636.5	$593.0	$584.7	$221.7

*Data for 1947-59 from National Association of Furniture Manufacturers and National Office Furniture Association. Estimates for 1960 and 1970 by NAFM and STEEL.

• **As Goes the Economy**—Manufacturers of metal furniture (excluding springs for upholstered furniture) see nothing but growth over the long term. Says John M. Snow, executive vice president of the National Association of Furniture Manufacturers: "The sales of metal furniture are closely tied to the health of the economy. In bad time, sales drop off. They ride high in good times."

• **Metal vs. Wood**—The largest segment of this industry is office furniture, and here the long term trend is definitely in favor of metal. In 1947, metal accounted for 72.8 per cent of all office furniture. Today, it's about 81 per cent.

Office furniture manufacturers also point out that their market is two-pronged: The new equipment market is the most important, but the replacement is gaining importance as styling improves. John R. Gray, executive director of the National Office Furniture Association, claims that styling changes constitute about 95 per cent of the factors in selling new equipment.

• **Suburban Living** — One of the strongest influences on dinette and summer and casual furniture in recent years has been the trend to suburban living. Small kitchen dining areas, patios, outdoor cooking, and swimming pools have brought "dynamic progress in the last five years," say officials of the Summer & Casual Furniture Manufacturers Association, a division of NAFM.

• **Materials Change**—These factors also have brought about changes in materials used in the manufacture of metal furniture. Aluminum is making the biggest inroads in what used to be considered an exclusive steel (or wrought iron) market.

But steelmen are not sitting on their hands, either. Officials of Chromcraft Corp., St. Louis, report that U. S. Steel Corp. has selected some of its furniture for use in national TV commercials to promote the Steelmark symbol (STEEL, Jan. 25, p. 24).

Plastics too are making inroads, manufacturers say, but most feel they are not hurting the use of metals (see Page 103). Officials of Homecrest Co., Wadena, Minn., feel that plastics in conjunction with metal will help to broaden the market.

• **Foreign Competition**—Most manufacturers fail to see any immediate threat from imported metal furniture. They say the market is too competitive and furniture is too bulky to make overseas shipping attractive to foreign producers. In addition, U. S. styling is generally more attractive. L. R. Addington, vice president and general manager of Art Metal Construction Co., Jamestown, N. Y., says that Japan may enter the market within the next 24 months with competitive goods. Others see the possibilities of competition from the European Low Land countries.

AEC Chairman John A. McCone sets a goal . . .

Competitive Nuclear Power May Be Ready by 1968

LAST WEEK Congress got plans from the Atomic Energy Commission which could make nuclear power commercially competitive with fossil fuel power in high cost energy areas.

AEC's definition of high cost energy areas: Where fossil fuels now cost at least 35 cents per million Btu.

The three phase development program outlined last year will be continued: 1. Construction of experimental reactors by the AEC. 2. An AEC-industry program for prototype reactors. 3. Construction of commercial size reactors by private industry—although AEC "will consider" assisting private firms to build "certain" plants for demonstration purposes. The cost of the program, excluding commercial plants, will run $180 million to $200 million a year. The bulk of the money will be spent by the government.

Technology Needed in These Areas

• **Light Water Cooled Reactors**—"There is a relatively high probability" that this type can achieve competitive power where large units are practical "in the reasonably near future," says AEC. Examples are the Shippingport, Pa., station and the Yankee Atomic Electric Co. plant at Rowe, Mass. One more pressurized water prototype may be justified, says AEC. Construction might start in three years. Also under consideration: Another prototype using the spectral shift technique (addition of heavy water to light water). A nuclear superheat prototype is recommended by 1963, if initial studies prove the system is economical.

• **Organic Cooled Reactors**—AEC likes the "simplicity" of this system and also rates its chances of success as high. Invitations to build a prototype have been issued. AEC will build it itself if private industry does not respond. Assuming success of the prototype, another will be planned for 1965 or 1966.

• **Sodium Cooled Reactors**—Competitive power from this type is predicted for the late 1960s or early 1970s. Problems with fuel elements and components remain to be solved. A prototype of the epithermal variety is planned to start in 1963 or 1964. The Hallam, Nebr., facility is of the thermal variety; if successful, prototype plants will be initiated within three or four years.

• **Enriched Gas Cooled Reactors**—Enough information will not be available until the early 1970s for utilities to decide whether to construct large stations.

• **Heavy Water Reactors**—On the bases of U. S. and Canadian experiments, the AEC may be able to recommend whether this type is economical by 1966 or 1967.

• **Aqueous Homogeneous Reactors**—Technical complexities and temperature limitations must be solved. A third experimental reactor could be built if the first two prove out by 1962 or 1963.

The AEC is also considering reactor concepts still in the "idea" stage. It reports that three to five experimental reactors may eventually be justified. It is also doing extensive research to cut fuel cycle costs, fuel reprocessing, and waste disposal.

The challenge: The AEC is seeking means to develop higher heat transfer rates, better instruments to measure reactor performance, and better fuel handling equipment, including a way to remotely fabricate fuel elements.

Other areas where metalworking can help: Perfection of remote inspection and pressure test equipment; the development of better pumps, compressors, valves, and seals; and improved techniques for cutting fabrication costs.

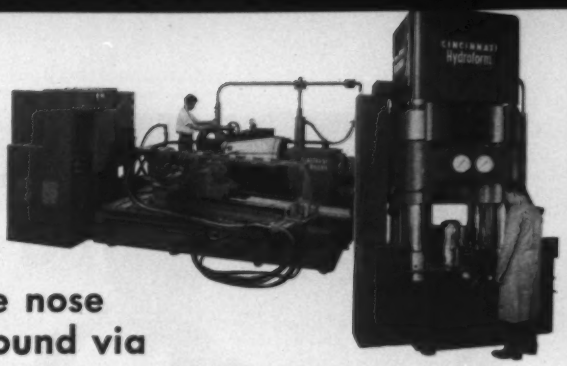
Competition with Private Firms Denied

Replying to charges by the U. S. Chamber of Commerce and others that its activities constitute competition with private industry (STEEL, Feb. 1, p. 53), the AEC notes these reasons for keeping some work to itself: 1. Some activities are closely integrated with AEC plant operation, and "in accordance with accepted industry practice," should stay integrated. 2. Some activities are in such a fundamental stage of development that "the co-ordinated use of the skill and facilities at government owned installations" is required. 3. The AEC should continue to handle military requirements for which it has made "extremely large" investments in plant facilities. 4. It would be impractical for industry to handle some work where volume is small, sporadic, or not standardized. 5. For some activities, there is no known commercial capacity.

Fig. 2

Fig. 2, above. Sonic measurement of finished Hydrospun Nike Hercules nose cones. Thickness of the tapered wall is held to ± .006". Photos and data courtesy of Lycoming Div., Avco Corp., Stratford, Conn.

Cincinnati® Hydroform® machines are built in 8", 12", 19", 23", 26" and 32" sizes; Hydrospin® machines are built in a variety of styles and sizes to meet your production requirements.



Another missile nose gets off the ground via

CINCINNATI Hydroform/Hydrospin!

NIKE HERCULES NOSE CONES are in quantity production at Lycoming (Stratford) Div., Avco Corporation, subcontractor to Douglas Aircraft Co., Inc., Charlotte Div., for these missile components. The success of this work is due to the unique capabilities of Cincinnati Hydroform and Hydrospin machines to form the nose cone to the desired contours and to the degree of precision required.

In the foreground of Fig. 1, below, are shown the five work stages to produce the finished part. "A" is the 17" dia. blank of ½" thick, annealed 6061 aluminum, which is preformed by a Cincinnati Hydroform to the shape shown at "B". Parts "C", "D" and "E" represent the nose cone shape progression through three passes on a Cincinnati Hydrospin. Wall section of the final shape is tapered from .078" at the nose to .125" at the aft end, with wall thickness controlled by the Hydrospin to ± .006". The metal of the finished part is solution heat treated to a T6 condition.

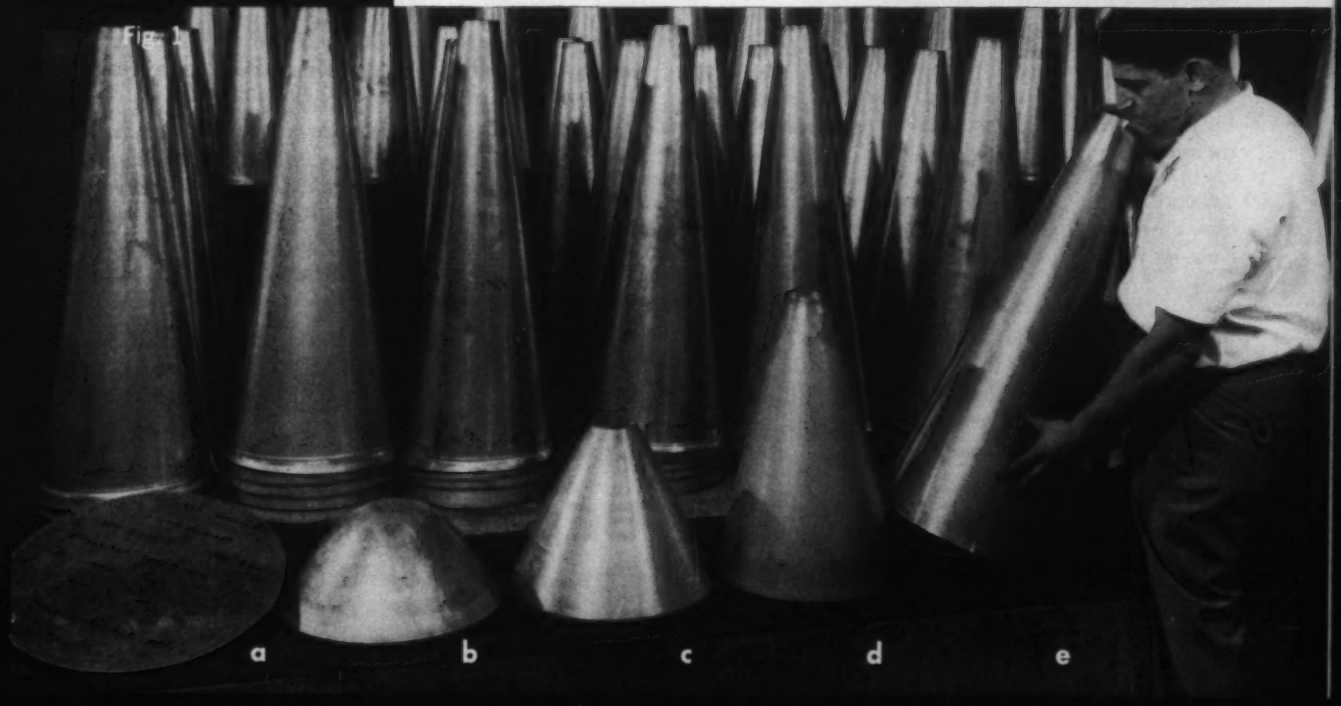
This winning Hydroform-Hydrospin combination is aiding missile and many other component parts manufacturers to produce formerly difficult or impossible sheet metal shapes to specified tolerances . . . while producing major savings in *time*, *tooling*, *labor* and *material costs* as well. Look into the many advantages of Hydroforming and Hydrospinning. Call in a Meta-Dynamics Division field engineer for full details.

Hydroform/Hydrospin
META-DYNAMICS DIVISION
Machines for Metal Forming and Heat Treating

THE CINCINNATI MILLING MACHINE CO.
Cincinnati 9, Ohio, U.S.A.

CINCINNATI

Fig. 1



Here's one way to lick the tobacco surplus!

The only thing operating in Department 3 is the cigarette machine. The men have been standing around since they clocked in this morning. Loafers? By no means. It's just that no work has reached their department.

Yet certain other departments have more work than they can handle. Overtime on the one hand... idle time on the other. Think what scheduling like that does to profits!

Management finds out about these things, of course—when it's too late. But with Automatic Keysort Data Processing they need not occur at all. Keysort work-load summaries enable you to schedule production jobs by department *in advance*. Knowing what's ahead, you can transfer men, plan extra shifts or layoffs so that each man-hour pays off fully in work done.

Automatic Keysort's easy-to-use machines and punched cards require no specialized personnel, no restrictive procedures. Designed to fit your business as it stands and as it grows, Keysort will give you all the fast, accurate information you need for modern management control of every operation. And at remarkably low cost.

To learn more about Automatic Keysort Data Processing, call your nearby Royal McBee Data Processing Representative, or write Royal McBee Corporation, Data Processing Division, Port Chester, N. Y. for brochure S-500.

ROYAL McBEE · *data processing division*

NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION

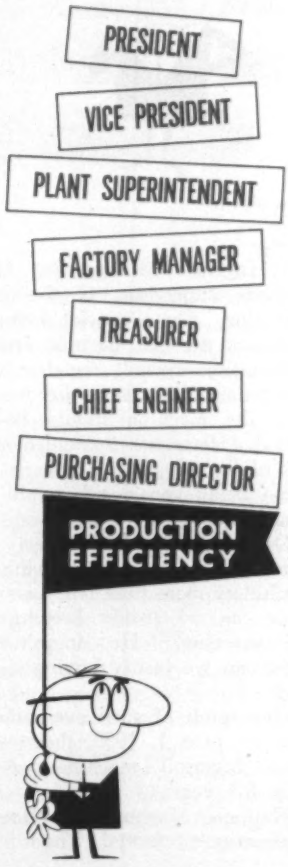
How to Organize to Buy Equipment

IS your company organized to gain greater production efficiency via the better purchase and use of capital equipment?

If it is, it's in the minority.

In a spotcheck by STEEL, the machine tool industry could cite only 90 companies in the U. S. that have outstanding re-equipment programs. We followed up with a survey of 48 Cleveland firms, a reliable cross section of metalworking, ranging from a foundry to an appliance manufacturer. The results:

- 25 per cent of the firms interviewed had no specific procedures for evaluating and authorizing proposed capital equipment programs.
- 50 per cent had procedures on paper but didn't follow them too closely.
- 25 per cent were fairly well prepared.



The Cleveland study was done by a team of graduate students at Western Reserve University's School of Business. Employment of the companies interviewed varied from 100 to 1600. The managers queried had titles ranging from plant superintendent to chairman.

Project the Cleveland experience to a national basis, and you can see why metalworking may have trouble meeting a $20 billion challenge to spend wisely for production equipment to win optimum efficiency. That's the sum managers estimate the job would take. If that money isn't spent or isn't spent wisely, we face a cancer that would eat away our industrial supremacy.

Needed is some kind of procedure for originating equipment spending ideas, evaluating the proposals, and approving the program.

The Ground Rules

The first step toward good organization is a capital spending budget. Wedler Bros. Inc., Cleveland, (employment, 36) aims at replacing about 10 per cent of its equipment annually. Caterpillar Tractor Co., Peoria, Ill., (employment, 42,000) budgets $50 million to $60 million a year for capital outlays.

The next step toward organizing for production efficiency is to determine whether you will centralize or decentralize your equipment purchasing. The survey team found that 85.4 per cent centralize; 14.6 per cent decentralize. About one-fourth of the firms with centralized setups and all those having decentralized setups had multiplant operations. The consensus is that it's wisest to centralize as much as possible. Most decentralized arrangements arise because plants are scattered, or because the company is so widely diversified that no one man or group of men can originate or evaluate equipment proposals.

A third step toward organizing the capital spending function is to break it down by kinds of expenditures. Most outlays arise because of the need to replace, expand, or retool. The methods of originating and evaluating replacement programs are different from those for expansion or retooling projects. Some 62.5 per cent of the companies surveyed say they make a distinction. All that did not were small firms. Expansion and retooling proposals usually originate high in the managerial ranks, after marketing forecasts show the need for more capacity or new models. Since World War II, the second and third requirements have accounted for most of our capital spending, but now expansion, particularly, is leveling off, and replacement is becoming more important.

Replacement programs are, by far, the most difficult to start, judge, and get approved. For the rest of this article, we'll concentrate on replacement.

Who Originates?

The plant superintendent, general manager, or foreman originates replacement equipment spending requests in 70 per cent of the companies checked by the Western Reserve team (see chart, Page 44).

The plant superintendent made the start 30 per cent of the time. Production middle management originates most requests in companies employing 200 or more. In firms smaller than that, top management assumes the duty.

At Standard Pressed Steel Co., Jenkintown, Pa., anybody from President H. Thomas Hallowell Jr. on down can originate an idea. (For details on the procedure at SPS, see Page 46.)

Ingersoll Milling Machine Co., Rockford, Ill., has a similarly broad policy of encouraging anybody from the machine operator on up to suggest new equipment.

Caterpillar Tractor believes that specialists should originate most

equipment spending proposals. Each of its plants has a planning division which is actually an industrial engineering group. Planning collaborates with the factory manager and other manufacturing managers to come up with a proposal. While theoretically anybody could come up with an idea, the planning people do so most of the time "because that's their job," points out C. A. Woodley, executive vice president.

At National Machinery Co., Tiffin, Ohio, foremen—even machine operators—originate ideas. The foreman (who would be called a department manager in most companies) is the key man. He keeps up to date through:

1. Business magazine reading.
2. Attendance at trade shows.
3. Interviews with equipment salesmen.
4. Regular visits at other plants.

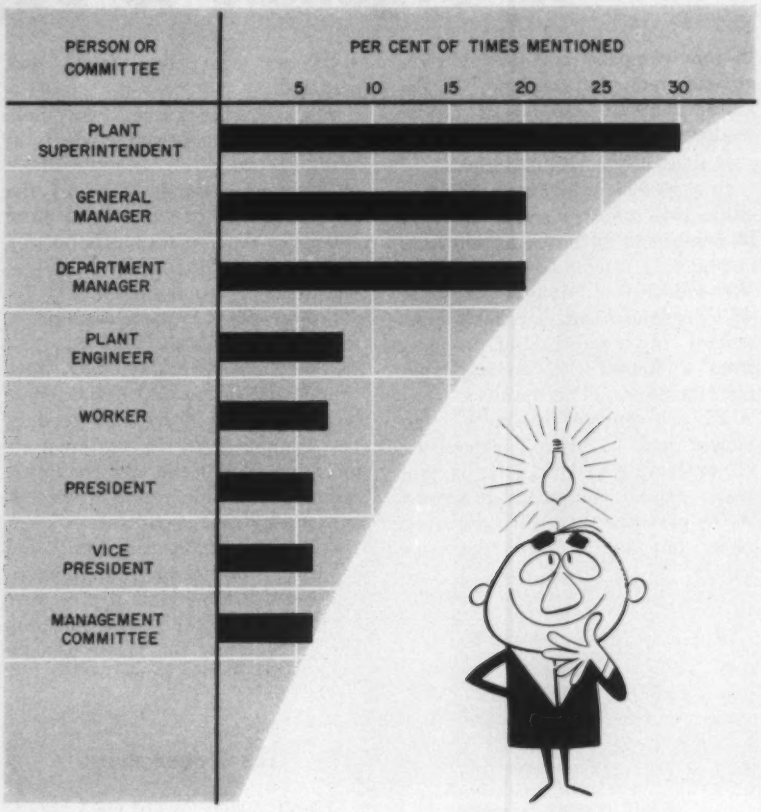
The last method is especially helpful in crossfertilization. The foremen visit all kinds of plants, not merely those of machinery builders.

The Cleveland survey indicates that more than one external factor is usually the genesis for an equipment spending proposal. But salesmen, business magazines, and the practices of competitors were mentioned as being important 82 per cent of the time.

Other idea generators: Catalogs, direct mail, trade associations, trade shows.

If the expenditure is small enough, some companies allow the originator of the proposal to go ahead with the purchase without evaluation or approval. The Cleveland survey reveals that a plant superintendent or factory manager is often allowed such freedom when the outlay is $600 or less. That's an average break point, too, for another purpose. If the expenditure is under $600, it's usually expensed for accounting purposes. If it's over $600, it's carried as a depreciable account.

Who Originates Ideas?



Source: Survey for STEEL by School of Business, Western Reserve University.

Who Evaluates?

Metalworking tends more and more to evaluate equipment proposals by committee, the Western Reserve survey shows.

It found that some kind of executive group did the job in 30 per cent of the companies interviewed (see the chart). The factory manager is next in importance.

Actually, some of the bigger companies have a whole series of evaluation points. The proposal at Caterpillar Tractor is first evaluated at the plant level. The planning group, top manufacturing managers, and the factory manager judge the project in terms of quality, capability, delivery time, vender performance, and cost.

If they can agree on the project, it is then submitted to James Munro, vice president for manufacturing, and L. J. Ely, director of manufacturing. They evaluate it again, using the same criteria, and they add this dimension: Does it fit in with the general capital budget?

If those two approve it, it goes on for the final O.K. and purchase authorization.

At Ingersoll Milling, Ray Hoss, methods supervisor, is the chief evaluator. On a special form, he evaluates the old machine and its performance record, together with maintenance costs and other reasons why the machine should be replaced. He makes a detailed analysis of the advantages of each machine being considered as the replacement.

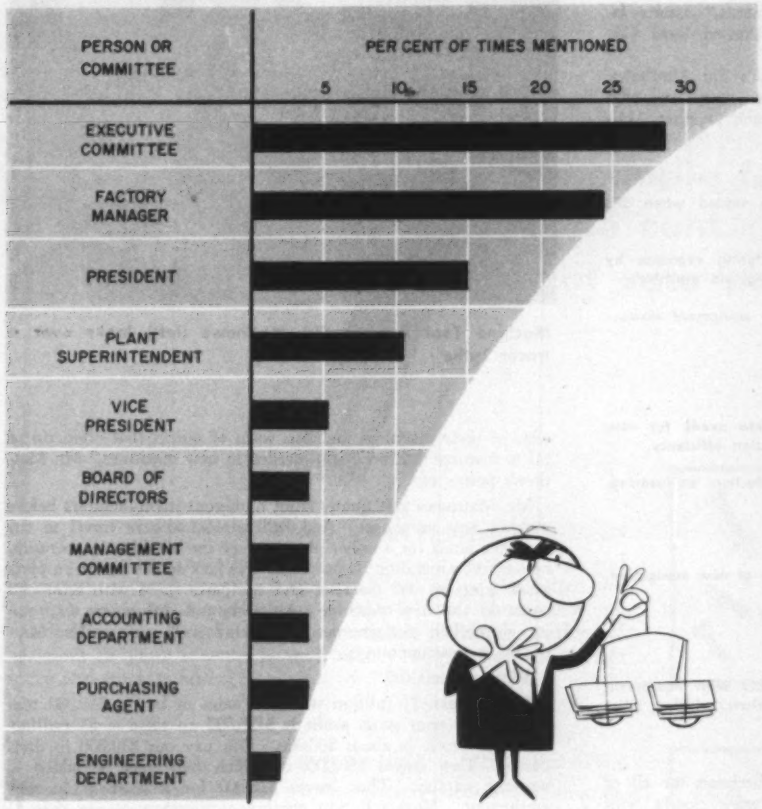
One question he always asks himself in evaluations involving any machinery more than ten years old: How can we justify keeping this old machine? He doesn't ask: How can we justify buying a new one?

One result of such evaluation is that on June 1, 1959, the average age of Ingersoll's machine tools was only 5.3 years.

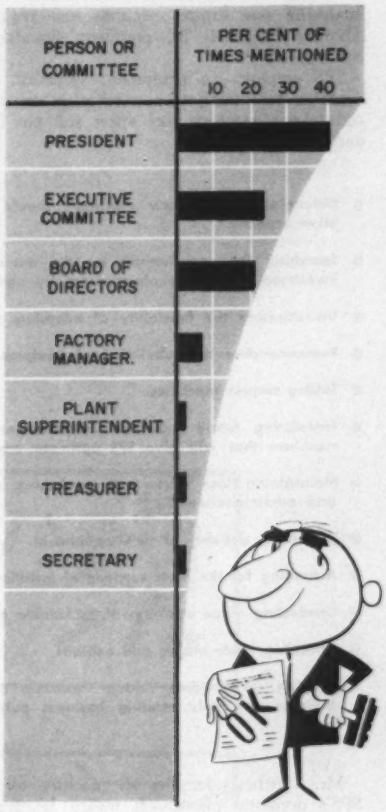
National Machinery's recipe for evaluating is informal. The foreman

to Buy Equipment

Who Evaluates the Proposal?



Who Decides to Buy?



who originates the proposal must justify his request to himself, the plant engineer, and the plant manager. If they can agree, the request is turned over to the purchasing department. Several suppliers are brought in.

"We usually try to get about four quotes on each program," says W. J. Artner, plant manager. "Those quotes are relayed by the foremen to the machine operator. The operator is permitted to go over the quote and point out features he likes or doesn't like."

When the evaluation procedure —going all the way down to the machine operator—is completed, the project goes to top management for the decision.

Does National's method work? The company has 496 pieces of capital equipment. Average age: 8.3 years. In 1946, the average age was 19 years, company records show.

Who Decides?

"The person making the final decision is usually not the same person doing the evaluation," conclude the Western Reserve surveyors.

In nearly half the companies (see chart), the president approved or rejected proposals after the executive committee had made the initial evaluation.

The executive committee came next—one-fourth of the companies used this channel. Note that in firms where the executive committee passed final judgment, the evaluation was usually done by a person such as the factory manager or plant manager. That was the characteristic of smaller companies.

The man evaluating the program usually does not have authority for approval. The reason is the recognition of a need for a new and unconditioned final judgment.

Mr. Woodley is the final authority at Caterpillar Tractor. Actually, the board of directors has the power, but it has given broad approval in advance for general projects. As long as the proposals coming to Mr. Woodley are within the framework of delegated authority, he can rule on them. But if they are outside that framework (if, for example, they cost more than originally allotted), they must go to the board for approval.

Mr. Woodley makes his yes or no by the rule of exception. He knows that each case has been thoroughly screened before he gets it. He sees if it jibes with experience, or if it makes sense in other ways. He doesn't get into de-

Portrait of an Equipment Specialist

Why It Pays to Put One on Your Team

"We can't afford not to have someone carefully studying and analyzing our future machine tool requirements," asserts H. Thomas Hallowell Jr., president, Standard Pressed Steel Co., Jenkintown, Pa.

SPS employs an equipment specialist. He's Sid Matthews, machine tool analyst—a purchasing department employee who can take a machine tool apart and put it back together. His duties include:

- **Determining what new machines should be added when SPS hikes capacity.**
- **Searching for opportunities to trim manufacturing expenses by investment in new equipment, or by updating old machines.**
- **Investigating the feasibility of adopting new equipment ideas.**
- **Recommending the rebuilding of equipment.**
- **Selling surplus machines.**
- **Translating future production requirements into needs for new machines that will give SPS optimum production efficiency.**
- **Maintaining close liaison with purchasing, production, engineering, and administration.**
- **Expediting delivery of new equipment.**
- **Arranging for the most economical installation of new equipment.**
- **Conducting value analyses of perishable tools.**
- **Attending trade shows and exhibits.**
- **Keeping up to date through constant contact with equipment builders, regularly reading business publications, visiting other plants.**

Mr. Matthews handles all machine tool purchases for all of SPS's domestic plants. It means he must work closely with top management. He also maintains a solid relationship with foremen and machine operators. "They have an intimate knowledge of their machines and can warn of quirks that often tip us off to features that are really needed in new machines," Mr. Matthews points out.

Machine Tool Analyst Sid Matthews (left) looks over a tracer lathe

Mr. Matthews gets quotes from numerous manufacturers before making any purchases. And he'll almost always travel to the builder's plant (or another plant) to see the machine in operation before recommending its purchase. He gets detailed costs on parts made from an old machine and compares them with estimated costs on the new machine. He estimates differences in quality, durability, performance. Mr. Hallowell reviews Mr. Matthews' recommendations.

Why a specialist?

It may take $1 million worth of sales to buy a $15,000 machine. Say your gross profit is $120,000 on sales of $1 million. After-tax profit is about $60,000. You pay out $30,000 in dividends. That leaves $30,000, of which half may be added to working capital. That leaves $15,000 for investment in new equipment. Moral: If you employ a salesman to get that $1 million worth of business, why not employ an analyst to see that the gains from it are wisely spent?

---

cisions on processes or makes of equipment. That's decided by planning and factory people. He only reviews their decisions.

Mr. Woodley must see every capital expenditure proposal above $1000.

At Food Machinery & Chemical Corp.'s machinery divisions, San Jose, Calif., division managers can approve capital expenditures up to $2500. Expenditures from $2500 to $25,000 must be approved by Donald U. Kudlich, manufacturing co-ordinator, and B. C. Carter, executive vice president for the divisions. Bigger expenditures are approved by the executive committee, consisting of the president, executive vice presidents for various divisions, and the vice president for finance.

In the smaller Ingersoll Milling Machine Co., two men make the final decision, Clayton Gaylord, president, and Edson Gaylord, vice president and general manager.

Your company would be like a sailboat without a sail if it had no procedure for originating equipment spending ideas, evaluating the proposal, and deciding the program.

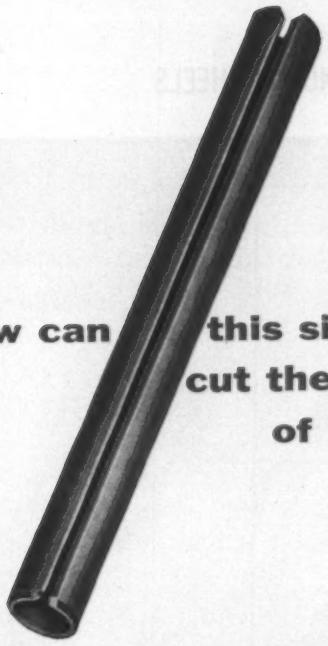
Most companies checked by STEEL agree that it's usually wisest to have one man or group evaluate the proposals and a different man or group give the final judgment.

With a procedure and with safeguards, you're on your way to winning higher production efficiency through better equipment.

Production Efficiency

How to Sell It to the Boss

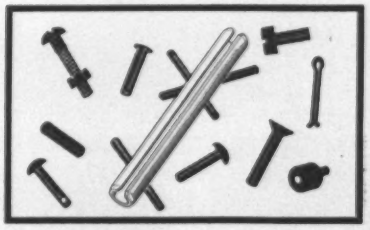
On Mar. 7, STEEL will discuss that subject, showing how your procedures for the generation, evaluation, and approval of capital spending ideas can be lubricated. For a free copy of each article in this Program for Management Series (they have been running every other week since Jan. 11), write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. Your use of material like this in STEEL may win you $1000. For details, see Page 6.



How can this simple fastener cut the cost of your product?

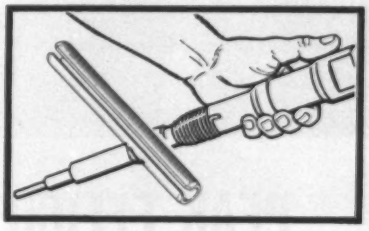
Rollpin aids standardization and reduces inventory

Rollpin readily replaces taper pins, grooved pins, straight pins and set screws; it can be used as a locating dowel, hinge pin, cotter pin, stop pin or, in some applications, even as a rivet. Thus, when you standardize on a Rollpin you can drastically reduce the variety of fasteners in your inventory—save money in purchasing, storage space and stock handling.



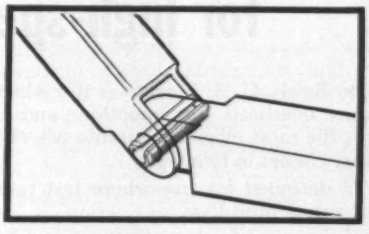
Rollpin simplifies production processing . . . saves man-hours

When you use Rollpin you can eliminate costly precision drilling, or tapping operations. And there's no need for any secondary locking operation—such as lock wiring or peening. That's because Rollpin is a slotted tubular steel spring whose chamfered ends drive easily into standard production-drilled holes, compressing as driven. The spring tension against the hole walls retains Rollpins securely against severe vibration. Independent studies have shown that installed costs of Rollpin are as much as *91% less* than those for a dowel pin or *95% less* than the installed cost of a taper pin.



Rollpin simplifies product maintenance

Only a drift pin or standard punch is required to remove a Rollpin. The slotted tubular shape and the spring action principle do not damage hole walls or enlarge the original hole diameter. Consequently the same pin is easily re-inserted and can be used again and again. Mail our coupon today for the complete Rollpin story.



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Safety guard removed to illustrate full view of Flexlite Grinding Wheel

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for high-speed portable grinding

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U.S. Flexlite Raised Hub Wheels are built for the utmost safety—their manufacture is controlled by unerring electronics. Layers of fiber glass reinforce the wheel. These wheels give you a cost-saving advantage right from the start.

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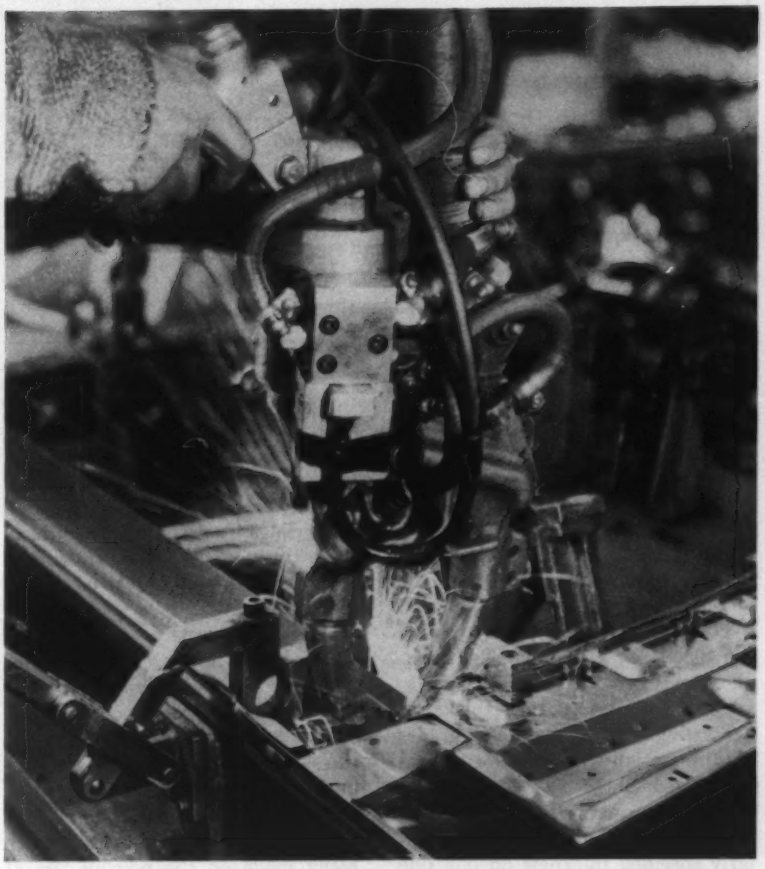
Ford Hurdles Galvanized Welding Barrier

WIPED GALVANIZED SHEETS, increased dwell times and pressures, and improved tip shapes are helping Ford Motor Co. make 2400 spotwelds between tip dressings on galvanized body sections for its two compact cars—Falcon and Comet. The subassemblies are built at Ford's Buffalo stamping plant and shipped to assembly plants at Lorain, Ohio; Kansas City, Mo., and San Jose, Calif.

Ford's knowhow may help other metalworkers who will be turning to high production runs in galvanized in the next few years.

Galvanized steel ranging from 0.075 to 0.035 in. is used for rear rails, rocker panels, front rail extensions, and torque boxes in the unitized bodies of the compacts. Each Falcon takes 70 lb of galvanized, each Comet 80 lb. Other automakers have turned to zinc rich primers or body dips to prevent corrosion of those parts. Ford believes galvanized steel provides the best quality control at the least cost. At present production rates, the company will require 30,000 tons of galvanized during the 1960 model run.



Overhead welding guns are used as stampings revolve merry-go-round style

• **Many Materials Tested** — The company's research and engineering laboratories started investigating different methods and materials for corrosion protection of unitized Falcon body parts in mid-1957.

John Widman, manager of advance body development, reports that dipping and painting processes were discarded as being too expensive and too difficult to control in volume production. "We could never be sure that the dip or paint would get into all the blind areas of the body structural members," he explains.

The company also tried foams, greases, and plastic films. "Many of them worked well under laboratory conditions, but the best we could say was that production performance would be erratic. Vapor inhibitors and chemical treatments also were hard to control," adds Mr. Widman.

As the search continued, Ford tried terne plate, tin plate, and aluminum clad steels. They proved unsatisfactory from cost or workability standpoints. Finally, it was decided that hot dipped galvanized steel sheets offered the best corrosion protection at the most reasonable cost.

• **Tackles Welding Problem**—Having picked its material, Ford's next problem was to pin down welding processes that would insure satisfactory bonds at high production speeds. Techniques that worked well on conventional carbon steels did not meet quality standards when used on galvanized parts.

"The electrode tips would pick up zinc from the surface of the steel. That created an alloy barrier on the tips that caused welds to button down to less than the 7/32 in. diameter that our standards require," explains Mr. Widman.

Many of the appliance firms, muffler manufacturers, and other companies Ford contacted were successfully welding galvanized steel,

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How Compact Car Sales Shape Up

January was the first month all compacts had an equal chance in the market place. Remember that Big Three compacts are competing with other lines in dealer showrooms.

Make	Sales per Dealer (Units)	January Sales (Units)	Number of Dealers
Rambler	**11.7**	**34,949**	**2,977**
Valiant	**7.9**	**8,146**	**1,028**
Falcon	**4.8**	**32,500**	**6,830**
Lark	**3.5**	**9,122**	**2,614**
Corvair	**2.3**	**16,500**	**7,241**

but only at low production rates. Ford was shooting for 600 spotwelds an hour.

• **Supplier Helps** — The company found that the amount of zinc pickup on electrode tips varied with the amount of zinc coating on the steel.

Ford worked closely with Weirton Steel Co., a division of National Steel Corp., Pittsburgh, in developing proper coating thickness.

Starting with commercial grades of differentially coated, hot dipped galvanized sheet (1¼ ounces of zinc per square foot), Weirton scraped off two-thirds of the regularly specified thickness on one side of the steel before it went into the coiler. The wiped side was color coded to identify it for press operators and welders. Result: Tip pickup now can be controlled so press welding equipment needn't be shut down for cleaning during shifts.

• **Techniques Checked** — While metallurgists were working on zinc coatings, process engineers were revising welding techniques that would help Ford meet high production rates and quality standards. The Buffalo plant uses mostly direct welding, hydraulically operated presses on the galvanized assemblies. Pressures were hiked as high as 900 psi in some cases although 700 psi does the job on the lighter gage parts. Dwell times have been lengthened from three and four cycles (1/60 second each) to eight or ten. That also calls for an increase in secondary amperages on many lines. A partially domed electrode tip is used so there's less area for zinc pickup. Class II electrodes are specified.

"Generally speaking, we've doubled dwell times and pressures on most of the operations," says Mr. Widman. The increases naturally boost weld point temperatures. "It's usually necessary to push all the water possible through the electrodes to cool them," adds Mr. Widman. Several studies are being made on the possible use of synthetic coolants, but they usually call for expensive heat exchangers.

• **Why Methods Vary**—Although the techniques work successfully at Buffalo, the different assembly plants have modified their practices slightly in welding the galvanized parts into car bodies. One reason: Compact car assembly plants use gun welders instead of press welders.

At Ford's Lorain plant, Clyde Miller, manufacturing process engineer, places most emphasis on dwell time. He indicates pressures are around 550 psi, but adds: "We try never to go below ten cycles on dwell time. If necessary, we'll go up to 15 cycles to get a proper size nugget." He also prefers parallel voltage because he feels it avoids much of the excessive spark explosion when initial tip contact is made at the weld point. Amperage is increased about 25 per cent for welding galvanized.

Because it uses gun welders, the Lorain plant can clean electrodes whenever necessary. That is about once every 2 hours compared with 3 hours for conventional carbon steel welding. At Buffalo, where press welders are most common, tips are cleaned every 4 hours.

• **Test Results**—Says Mr. Widman: "Pressure, dwell time, point shape, and cooling are the keys to locking up a satisfactory welding job on galvanized materials." Corrosion life of the unitized cars must equal the life of structural parts on conventional body and frame cars. Scribe tests and ASTM salt spray tests are used to measure corrosion resistance. Ford also has built up a number of box shaped galvanized test cells which it mounts on cars for in-service checking.

Rear rails and rocker panels are most corrosion prone, claims Mr. Widman. A grit roll is used to break up the spangle pattern on rocker panels to prevent excessive blistering. Those parts are also wire brushed and precleaned before Bonderizing so the Bonderite will etch the surface properly.

U. S. Auto Output

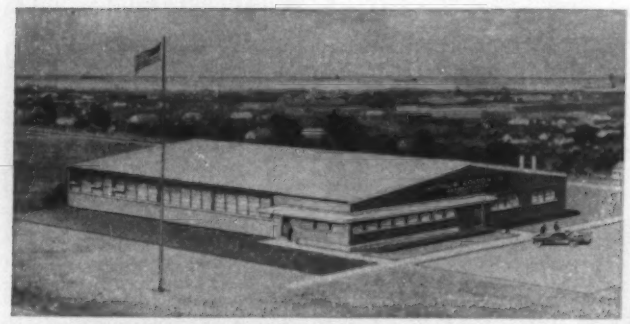
Passenger Only

	1960	1959
January	688,731	545,757
February		478,484
March		576,085
April		578,825
May		546,817
June		557,994
July		555,418
August		239,152
September		258,157
October		507,530
November		254,527
December		494,931
Total		5,593,677

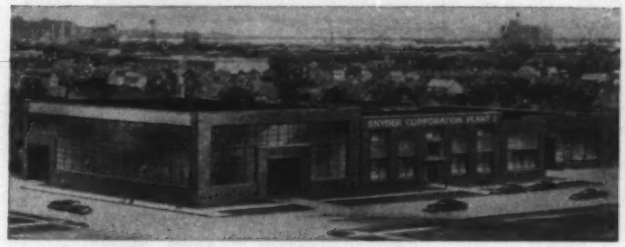
Week Ended	1960	1959
Jan. 16	173,713	135,953
Jan. 23	175,060	126,843
Jan. 30	173,231	119,678
Feb. 6	164,027	114,282
Feb. 13	154,551†	115,491
Feb. 20	152,000*	120,780

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

ANOTHER EXPANSION to Better Serve Industry in the Soaring Sixties



PLANT No. 4—ELK RAPIDS, MICHIGAN



PLANT No. 2—DETROIT, MICHIGAN

PLANT No. 3—MANCELONA, MICHIGAN

The recent opening of our Plant No. 4 in Elk Rapids, Michigan, marks the fourth expansion in our manufacturing facilities since we set up in business 35 years ago. In the intervening years, we have earned an international reputation for designing and building money-saving machine tools for many types of industries. We have also diversified our engineering and production talents so that our machines, which originally were specialized in metal-cutting operations, now reach into the nuclear power, electronic, chemical, drug, cosmetic and food industries and are used in processing many household products in everyday family use. To the many people who have helped us build this business, we say, "Thank you, sincerely."

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PLANT NO. 1—DETROIT, MICHIGAN

News about the nation's leading steel plate specialist

Helping solve Customers' problems is the job of Lukens Technical Service Department. Here are four members: (left to right) Lou Keay, Metallurgist and Department Manager; Les Dawson and Harry McClure, Welding Engineers; Dick Rote, Metallurgist.

LUKENS EXPANDS SHOP & FIELD TECHNICAL SERVICE

In our shops we test materials for specific jobs. We develop fabricating procedures, welding techniques, flamecutting, forming, machining. We compile data. We keep building a fund of information that can help fabricators make better use of Lukens carbon, alloy and clad plate products.

What our Technical Service Engineers learn in our shop they take into your shop. Before, during and after a job, they're available to assist you.

Lukens has expanded its Technical Service—as we have all our other services—to keep pace with your needs. Write B-20 Services Building.

Lukens Steel Company, Coatesville, Pennsylvania.

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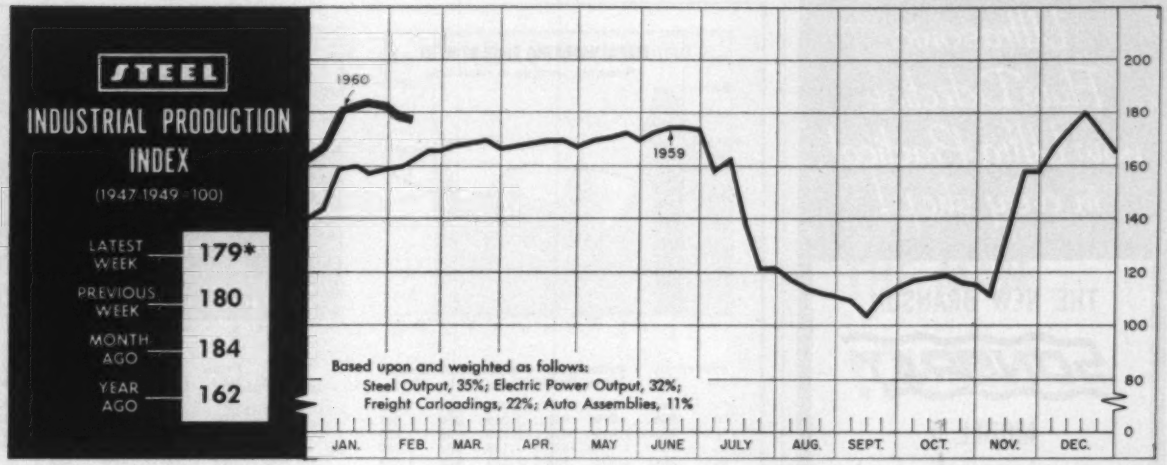

*Week ended Feb. 13.

1960 Will Still Be a Record Year

THE DOWNTREND in automotive production schedules is typical of what is going on in several parts of the economy. So far, the 1960 boom has not been the unbridled runaway which many expected. Still, this shapes up as the best all-around year in the nation's history, and unless some unexpected excesses develop later, next year could be better than a lot of people expected a short time ago.

• **Subtle Change**—Optimism is still the key word in automotive circles, but it is tempered with caution. Few manufacturers have cut back their 1960 estimates—at least publicly—but their actions are speaking louder than words. Since reaching a peak of about 175,000 cars a week in late January, output has fallen four weeks in a row. It is now barely above 150,000 units a week. Some of the trouble has been caused by part shortages induced by strikes, but of greater importance trendwise is the noticeable drop in Saturday and other overtime work.

The auto inventory buildup has been faster than expected, and a drop in sales has prompted a cutback in production. *Ward's Automotive Reports* estimates that February production will run 8 to 10 per cent below the 728,000 units originally scheduled.

However, the industry is not in serious trouble as yet. Sales last month were about 450,000 new cars, representing the best January since scare buying took sales to about 472,000 units in January, 1951. One economist who follows the industry closely says the pace is equal to an annual rate of 6.6 million cars, well within the estimates of Detroit officials.

New car stocks were about 800,000 units at the beginning of this month. That is still considerably below the all-time high of close to 1 million last summer. But the buildup from now until the spring selling season should be at a slower rate, reaching the 1 million mark

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,693[1]	2,687	2,449
Electric Power Distributed (million kw-hr)	14,000[1]	14,097	13,156
Bituminous Coal Output (1000 tons)	8,525[1]	8,865	8,415
Crude Oil Production (daily avg—1000 bbl)	7,200[1]	7,293	7,155
Construction Volume (*ENR*—millions)	$374.8	$377.4	$284.4
Auto, Truck Output, U. S., Canada (*Ward's*)	154,551[1]	164,027	115,491
TRADE			
Freight Carloadings (1000 Cars)	590[1]	588	567
Intercity Truck Tonnage (changes from year ago)	+5.7%	+4.8%	...%
Business Failures (Dun & Bradstreet)	318	281	271
Currency in Circulation (millions)[3]	$31,599	$31,566	$31,193
Dept. Store Sales (changes from year ago)[3]	+3%	+5%	+9%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$23,838	$26,655	$22,346
Federal Gross Debt (billions)	$291.0	$291.1	$285.6
Bond Volume, NYSE (millions)	$27.5	$29.2	$30.6
Stocks Sales, NYSE (thousands of shares)	13,484	14,075	14,792
Loans and Investments (billions)[4]	$102.2	$102.3	$102.6
U. S. Govt. Obligations Held (billions)[4]	$26.4	$26.7	$34.5
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	234.5	234.3	217.3
All Commodities[7]	119.2	119.2	119.4
Commodities Other than Farm & Foods[7]	128.6	128.6	127.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,849,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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THE NEW BRANSON SONORAY®

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pulse-echo type instrument

combines the highest performance yet achieved with the smallest size, weight and price in the field. It is equally at home in contact and immersed work.

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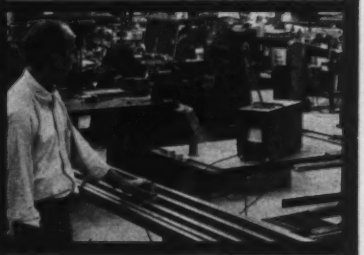

SONORAY® Ultrasonic Flaw Detector testing aluminum bar stock; easily probes the full 12-foot length as well as through thickness.

SONORAY® Model 5 clearly resolves 3/64" FBH at 3/16" in contact at 2.25 mc/s — reveals 1/64" FBH full-scale at 2.25 and 5.0 mc/s — brings laboratory precision into the field with simplified controls, a weight of only 37 pounds and a price of . . . . . $2750.

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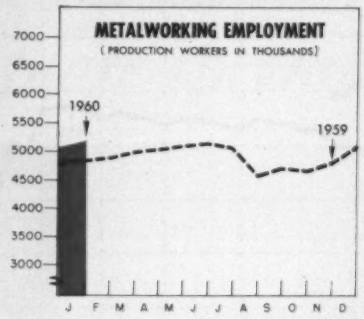
THE BUSINESS TREND



1959	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Jan.	952	820	1,057	791	1,216
Feb.	979	817	1,090	796	1,203
Mar.	1,015	829	1,113	798	1,226
Apr.	1,037	840	1,126	803	1,229
May	1,051	853	1,153	814	1,233
June	1,067	866	1,167	833	1,224
July	1,038	847	1,149	836	1,207
Aug.	628	815	1,138	849	1,132
Sept.	611	841	1,167	888	1,200
Oct.	602	812	1,147	893	1,208
Nov.	975	800	1,136	882	1,026
Dec.	1,039	843	1,163	893	1,185
1960					
Jan.	1,044	853	1,178	884	1,250

U. S. Bureau of Labor Statistics.
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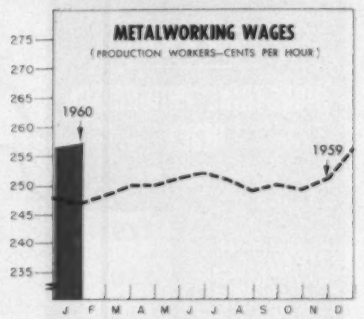


1959	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Jan.	277	232	244	220	262
Feb.	279	233	246	221	262
Mar.	282	235	248	221	263
Apr.	283	235	249	221	263
May	284	237	250	221	264
June	284	238	250	222	266
July	281	237	250	222	266
Aug.	264	238	250	222	269
Sept.	266	239	251	223	271
Oct.	265	236	252	224	270
Nov.	277	236	252	224	267
Dec.	285	241	254	227	273
1960					
Jan.	285	243	254	227	276

U. S. Bureau of Labor Statistics.

about May. If February sales fall significantly below the 6.6 million annual rate, look for some relatively sharp slashes in production.

• **Steel Holding Steady**—The auto and steel situations are analogous. The caution in steel arises not so much from a decline in production as the failure to maintain the recordbreaking trend of December and January. Since slipping beneath the 95 per cent of capacity mark in the first week of February, output has remained steady at 94.5 per cent, a weekly figure of about 2,693,000 tons.

But unlike automakers, steel producers are beginning to downgrade their earlier estimates for 1960. One steel official has trimmed his estimate by 10 million tons. Reason: "Consumers are not building stocks as high as we had anticipated. They learned a thing or two about their inventory levels during the steel strike, and now they are counting on quick delivery to keep them in operation. Of course, if there is any threat of a disruption of deliveries—like a railroad strike—we'll put that 10 million, and maybe more, right back into the picture."

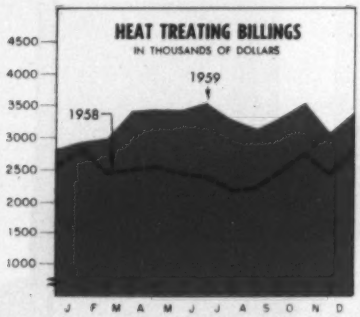
But the official is sticking to his steel consumption estimate: 116 million tons, the all-time best.

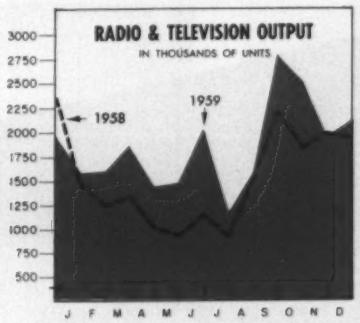
Some economists look on the slowdown in inventory building with mixed emotions. If the steel operating rate drops too much this year, they see a possible psychological letdown in business thinking. But they also realize that excessive steel stocks in 1960 could cause serious adjustment in 1961.

• **Appliances Overstocked** — What could happen to autos and steel seems to be an accomplished fact in the appliance industry. Stocks are heavy throughout the pipelines. Evidence: Price cutting and production cutbacks. Appliance makers were more successful than auto producers in maintaining output during the steel strike. Dealers, fearing shortages, took everything they could get. Indications are that consumers are still in a buying mood, so manufacturers are maintaining their earlier estimates of a 5 per cent increase in sales this year.

Slowdowns Brake Index

The effects of those slowdowns is evident in STEEL's industrial production index. In the week ended Feb. 13, it declined for the third straight time. At a preliminary 179





	1959	1958	1957
Jan.	2,915.5	2,825.5	3,533.9
Feb.	2,976.0	2,466.3	3,378.9
Mar.	3,397.3	2,490.5	3,631.8
Apr.	3,420.6	2,538.0	3,572.4
May	3,405.6	2,421.5	3,389.6
June	3,518.5	2,367.3	2,912.1
July	3,259.7	2,141.5	2,767.5
Aug.	3,111.3	2,212.9	2,830.8
Sept.	3,285.7	2,456.9	2,765.0
Oct.	3,509.8	2,754.3	3,076.2
Nov.	3,079.5	2,404.8	2,677.2
Dec.	3,349.9	2,765.5	2,579.3

Metal Treating Institute.

	Radio		Television	
	1959	1958	1959	1958
Jan.	1,125	1,026	437	434
Feb.	1,125	877	460	370
Mar.	1,348	931	494	417
Apr.	1,040	630	389	303
May	1,040	655	432	267
June	1,430	774	571	337
July	829	593	350	275
Aug.	1,009	981	547	507
Sept.	1,981	1,493	808	622
Oct.	1,796	1,322	707	496
Nov.	1,346	1,438	561	438
Dec.	1,553	1,526	593	415
Totals	15,622	12,246	6,349	4,921

Electronic Industries Association.

(1947-49 = 100), the trend line is 6 points below the record set in the week ended Jan. 23.

While steel has remained a neutral factor, the other three elements have been in a downtrend. Cold weather and moderately heavy industrial demand has kept electricity output 6 to 9 per cent above the year-ago levels, but the seasonal pattern is taking hold. Since the all-time peak of over 14.5 billion kw-hr was set last month, output has dropped to about 14 billion kw-hr.

Combined auto and truck production has dropped from the weekly peak of close to 207,000 units to about 185,000 units. Railroad freight carloadings have been hampered by extreme snow conditions in many parts of the country and have declined about 20,000 cars in the last three weeks. It is reasonable to expect delayed shipments to show up in future figures.

But Business Is Still Good

But don't let the current situation lure you into false pessimism. There are many signs that business conditions are still healthy. Prentice-Hall Inc., Englewood Cliffs, N. J., reports that six of its ten trend leading indicators were pointing up at last report. That's the best score since last July. The six: Durable goods orders; gear orders; residential building awards (floor area); average workweek; layoff rate in manufacturing; and industrial raw material prices. Heading down were: Machine tool orders; heavy construction awards; new hiring rate in manufacturing; and industrial stock prices. During the previous month, only four of the leading indicators were pointing up.

Survey Is Optimistic

Plant and equipment expenditures will increase in the Cleveland area, a survey by the Cleveland Electric Illuminating Co. shows. Ninety-two manufacturing firms plan to boost such spending by 15 per cent this year and another 25 per cent in 1961. While the 1960 increase is slightly below the national average, the 1961 gain is well above it, CEI claims.

In 1960, the 92 companies plan to spend $72 million for plant and equipment. Next year, the total will be $90 million. Comparisons: $62 million in 1958 and $63 million in 1959.

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The Metalworking Weekly

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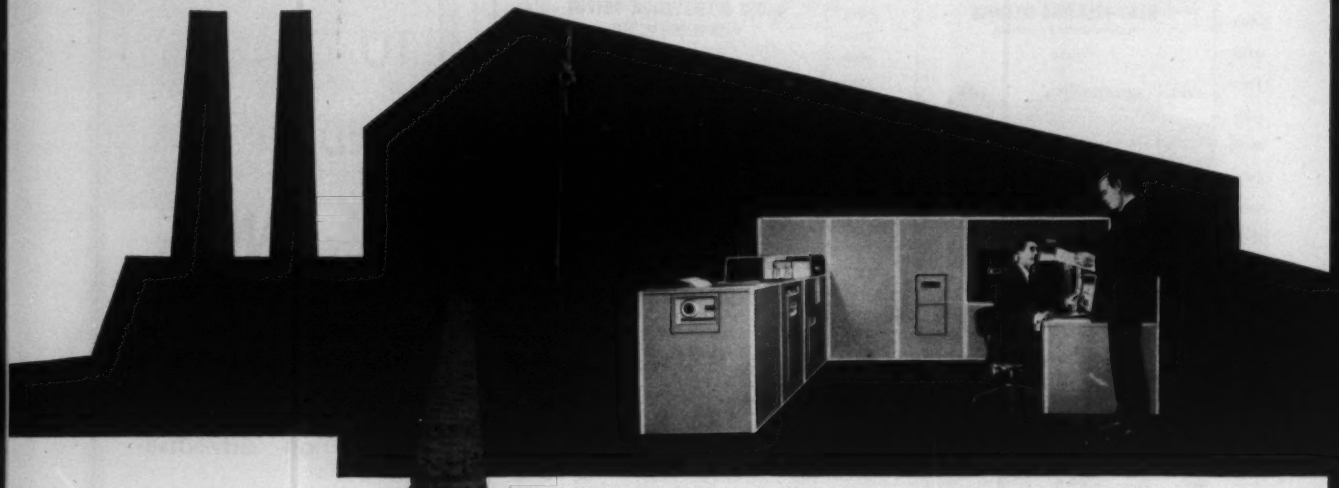

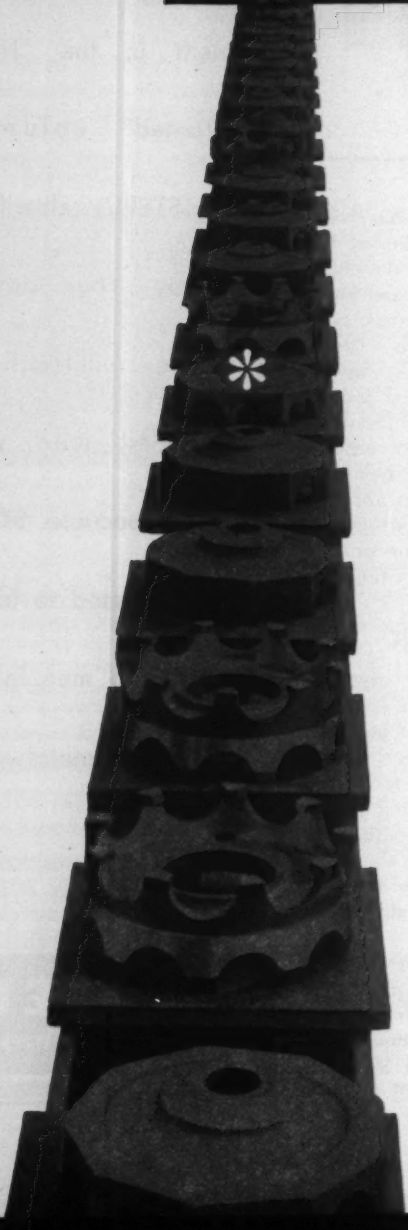

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balanced data processing

G. FINDLEY GRIFFITHS
Acme Steel president

ARTHUR S. NIPPES
Waterbury Farrel v. p.

BRUCE C. KNAPP
Alloy Metal Abrasive post

FRED B. O'MARA
Nat'l Carbon mfg. dir.

G. Findley Griffiths was elevated from executive vice president-commercial to president, **Acme Steel Co.**, Chicago. He succeeds **Guy T. Avery**, who in turn replaces **F. M. Gillies** as chairman.

Charles R. Billman was made general manager, **National Electric Div.**, Pittsburgh, H. K. Porter Company Inc. He was assistant to the president of Porter.

Fred W. Beitner was appointed general sales manager, **Trent Tube Co.**, East Troy, Wis., subsidiary of Crucible Steel Co. of America. He was Northeastern district sales manager with regional offices in New York.

Phoenix Products Co. Inc., Milwaukee, elected as vice presidents **William A. Wenman** who is in charge of the Metal Spinning Div.; and **Harvey S. Mathems**, in charge of manufacturing.

Worthington Corp., Harrison, N. J., appointed **W. C. Cheek**, **H. W. King**, and **W. J. Van Vleck** commercial vice presidents. Mr. Cheek is Midwest regional sales manager; Mr. King Western regional sales manager; Mr. Van Vleck Eastern regional sales manager.

Rufus C. Stillman was made assistant to the president, **Torrington Mfg. Co.**, Torrington, Conn. He continues over-all responsibility for personnel and advertising. He now assists the president in operating matters in the Air Impeller, Specialty Blower, and Machine Divisions.

Arthur S. Nippes was made a vice president of **Waterbury Farrel Foundry & Machine Co.**, Waterbury, Conn., a division of Textron Inc. He was consultant to the president of Simonds Saw & Steel Co., Fitchburg, Mass., and vice president-general manager of Disston Div., H. K. Porter Company Inc.

Bruce C. Knapp was named chief metallurgist of **Alloy Metal Abrasive Co.**, Ann Arbor, Mich. He was with Bridgeport Brass Co.

Harry A. Richards was made manager of raw materials at **Weirton Steel Co.**, Weirton, W. Va., a division of National Steel Corp. He succeeds **Thomas J. Hudson**, retired. Mr. Richards was assistant manager-raw materials.

Robert G. Lambrecht, general manager, **Automatic Spring Coiling Co.**, Chicago, was elected vice president.

Richard C. Diehl joined **Koppers Co. Inc.**, Pittsburgh, as a vice president in the Engineering & Construction Div. He was vice president-operations of Universal Cyclops Steel Corp. For seven years prior to joining Universal Cyclops in 1957, he was president of Chase Brass & Copper Co. Concurrent with his appointment as a Koppers vice president, Mr. Diehl was named general representative on the technical and management advisory agreement signed between Koppers and Acerias Paz del Rio SA, an integrated steel firm in Bogota, Colombia, where he will establish residence.

Fred B. O'Mara was named director of manufacturing, **National Carbon Co.**, New York, a division of Union Carbide Corp. He is at National Carbon's production headquarters in Cleveland. He succeeds **H. T. Reid**, who reports directly to Wm. H. Feathers, National Carbon president, in co-ordinating engineering aspects of the company's long range planning program.

Crane Co., Chicago, elected **T. B. Focke** vice president of its Plumbing-Heating-Air Conditioning Group, and **C. H. Lovelace** vice president of its Industrial Products Group. Mr. Focke was president of National-U. S. Radiator Corp. (now Natus Corp.), Johnstown, Pa., which Crane acquired Feb. 1. As vice president he heads a group of nine factories, with headquarters at Johnstown. Mr. Lovelace was director of Crane's marketing services.

Burroughs Corp., Detroit, named **R. O. Baily** assistant vice president and general manager, General Products & Systems Group; **E. S. McCollister** assistant vice president and general manager, Data Processing Systems Group. **Ken T. Bement** was recently made vice president and head of the newly created Equipment & Systems Marketing Div., which embraces the two groups.

Wilson J. Smith was elected vice president-manufacturing, **Northwestern Electric Co.**, Chicago. For the last three years, he served as works manager.

John Schmidt was made chief project engineer, Construction Engi-

GRANT C. WOODARD

HAROLD C. JOHNSON

Cooper-Bessemer vice presidents

E. WALTER ADAMS

CAREY E. LINDSAY

Kaiser Refractories operations posts

neering Dept., National Tube Div., Lorain, Ohio, U. S. Steel Corp.

L. L. Warriner was elected chairman of **Cooper-Bessemer Corp.**, Mt. Vernon, Ohio, to succeed **L. F. Williams**, who continues as a director and a member of the executive committee. Mr. Warriner has been engaged as a management and engineering consultant. **Grant C. Woodard**, general sales manager, was elected vice president-marketing. **Harold C. Johnson**, manager of manufacturing, was elected vice president-manufacturing.

Raymond N. Anderson was made plant manager of the Warren, Pa., metal base operations of **Sylvania Electric Products Inc.**, a subsidiary of General Telephone & Electronics Corp.

Elton E. Staples was appointed president of **Hevi-Duty Electric Co.**, Milwaukee, a division of Basic Products Corp. He succeeds **Harold E. Koch**, who will now devote more time to duties as executive vice president of Basic Products and as president of Como-Cast Corp., a subsidiary. Mr. Koch was named an executive vice president of Basic Products last July, shortly after Hevi-Duty became a division. Mr. Staples was Hevi-Duty general manager, and also has served as vice president-sales.

Orval A. Opperthauser was made chief engineer at **F. Jos. Lamb Co.**, Detroit.

Wean Engineering Co. Inc., Warren, Ohio, promoted **R. J. Erskine** to assistant chief engineer; **S. O. Perrine** to supervisor of engineering; **T. W. Madison** to chief draftsman, mechanical engineering.

Otto J. Manse was named manager of manufacturing at **Rollway Bearing Co.**, Syracuse, N. Y. He was with O. M. Edwards Co. Inc.

Kenneth Daly was elected vice president, **Nordson Corp.**, Amherst, Ohio. He was general manager of Western Automatic Screw Co., and vice president of its parent company, Standard Screw Co.

E. Walter Adams was made manager of operations, **Carey E. Lindsay** production manager for Eastern area plants of **Kaiser Refractories & Chemicals Div.**, Kaiser Aluminum & Chemical Corp. They are at the Columbiana, Ohio, basic refractories plant where Mr. Adams has been plant manager. Mr. Lindsay was general superintendent, clay and silica refractories plants.

Fred E. Kendall joined **S. K. Wellman Co.**, Bedford, Ohio, as assistant to the president, with special assignments for manufacturing and plant operations. He was with Lectroetch Co. where he served as vice president and director of research.

George W. Steinmetz was made manager of industrial distribution for **Pratt & Whitney Co. Inc.**, West Hartford, Conn. He was sales manager for W. H. Nicholson & Co., Wilkes-Barre, Pa., and prior to that was assistant sales manager for Standard Tool Co., Cleveland.

Michael J. Joncich was made gen-

ELTON E. STAPLES

Hevi-Duty Elec. pres.

OTTO J. MANSE

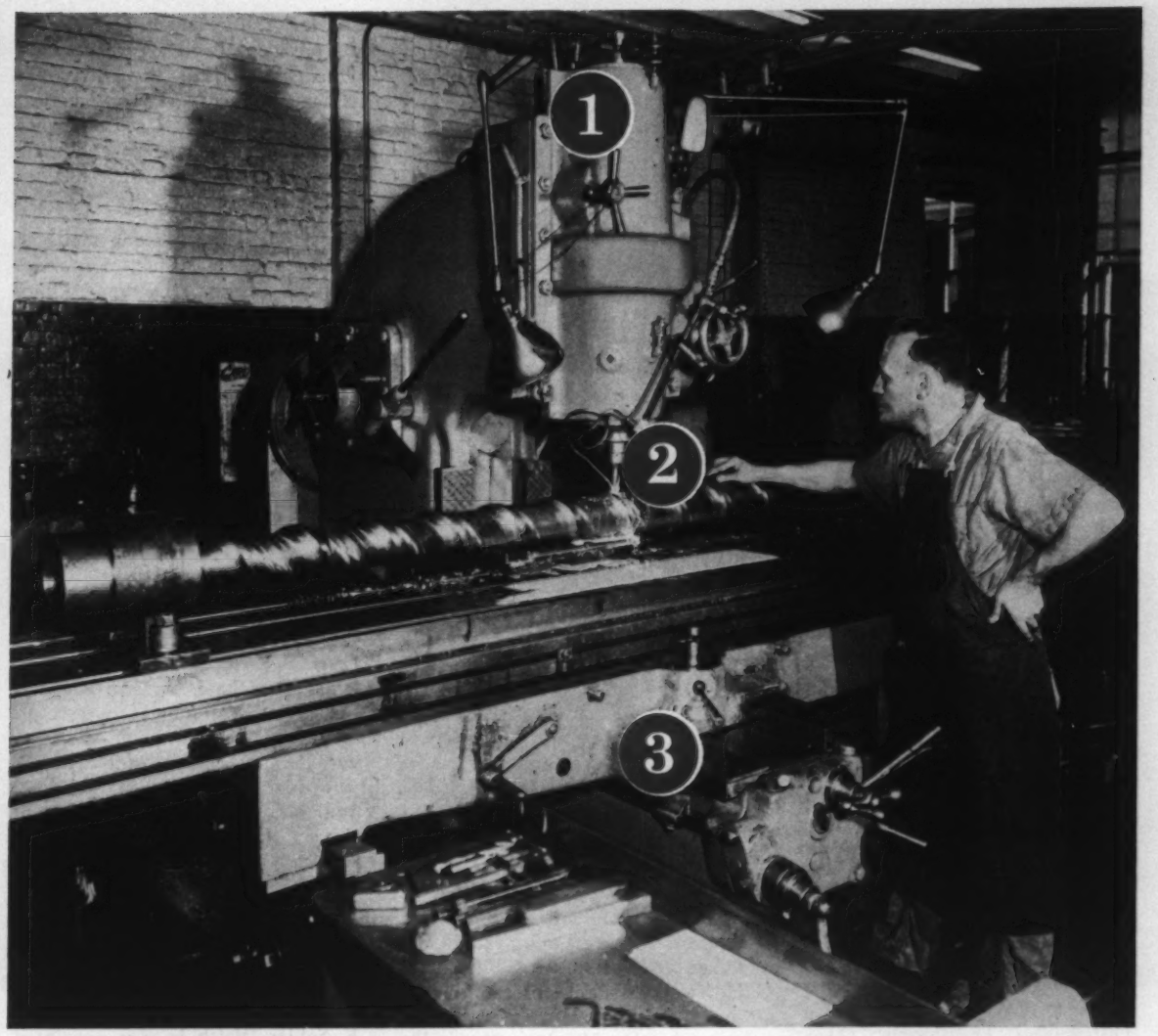
Rollway Bearing mfg. mgr.

KENNETH DALY

Nordson vice president

GEORGE W. STEINMETZ

P&W indus.-distribution mgr.



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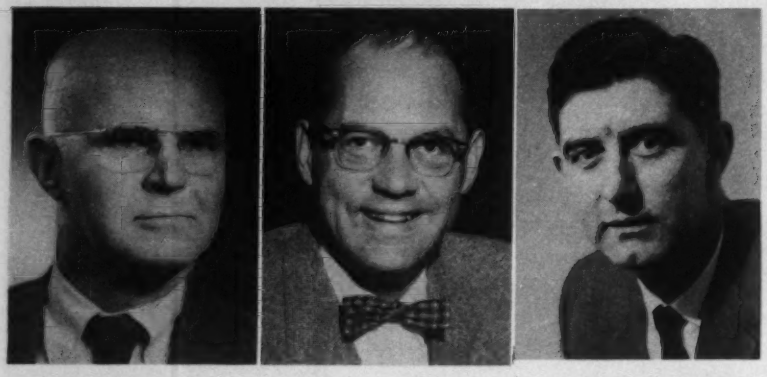
CHARLES A. McFADDEN
Bickley Furnaces v. p.

LOUIS POLK JR.
Sheffield operations mgr.

RICHARD P. SNYDER
Harbison-Walker dept. mgr.



HARLAND P. SISK
gen. mgr.-GE dept.

JOHN G. WHITE
Bethlehem Steel-Pacific post

DR. ERIC R. MORGAN
J&L research dir.

eral sales manager, **Datex Corp.**, Monrovia, Calif.

Harland P. Sisk was made general manager of **General Electric Co.'s** Distribution Transformer Dept., Pittsfield, Mass. He succeeds **Marc A. deFerranti** who joins the international group of the company in New York to study GE's foreign business.

John G. White was made general sales manager, Pacific Coast Div., **Bethlehem Steel Co.**, San Francisco.

Frank K. Clark Jr. was made chief engineer, **M. C. Jones Electronics Co. Inc.**, Bristol, Conn., a subsidiary of Bendix Aviation Corp.

Gordon E. Brown was named sales manager, West Coast Div., **Ampco Metal Inc.**, at Burbank, Calif.

Carlton H. Swanson was made factory manager of **Eaton Mfg. Co.'s Valve Div.**, Battle Creek, Mich. He was engineering manager. Mr. Swanson succeeds the late **Douglas F. Judin.**

Dr. Eric R. Morgan was appointed director of research, **Jones & Laughlin Steel Corp.**, Pittsburgh. He was assistant director of research in charge of metallurgical research. Dr. Morgan succeeds **Dr. Harold T. Clark**, now administrative director-research and development, responsible for technical direction of J&L research activities.

Howard W. Stephens, vice president, was elected president of **Berry Steel Corp.**, Roselle, N. J., to succeed the late **John G. Berry. Howard A. Davis** was made vice president and general sales manager. He was vice president-sales for Ardmore Products Inc., subsidiary.

W. W. Rutledge was named a vice president of **Aeronca Mfg. Corp.**, Middletown, Ohio. He recently resigned as manufacturing manager, Wichita Div., Boeing Airplane Co.

Robert A. Hall was made administrative manager, **Datalab Div.**, Pasadena, Calif., Consolidated Electrodynamics Corp., a subsidiary of Bell & Howell Co.

Charles A. McFadden was elected vice president, **Bickley Furnaces Inc.**, Philadelphia. He was divisional manager of Selas Corp. of America, and joined Bickley last September to assist in development and marketing of high temperature furnace equipment.

Louis Polk Jr. was made manager of operations, Product Divisions, **Sheffield Corp.**, Dayton, Ohio, subsidiary of Bendix Aviation Corp. He continues duties as assistant vice president and manager, Instruments & Systems Div., and direction of Sheffield's domestic and Canadian service plants. Threadwell Tap & Die Co., Greenfield, Mass., subsidiary, is now under his direction.

Richard P. Snyder was appointed manager of purchasing and engineering, **Harbison-Walker Refractories Co.**, Pittsburgh. He was chief engineer.

Lester F. Kuzmick and **Fred K. Ryan** joined **Bay State Abrasive Products Co.**, Westboro, Mass., to serve in manufacture and sales of diamond wheels and blades. Mr. Kuzmick was manufacturing vice president, and Mr. Ryan sales manager at Felker Mfg. Co., Torrance, Calif.

K. J. Kettner was made sales manager with headquarters in Chicago for **Ramtite Co.**, a division of S. Obermayer Co. **H. J. Shaner** was made division manager at Chicago with a wider territory of activity.

E. Sohier Welch Jr. was appointed vice president-engineering, **Fenwal Inc.**, Ashland, Mass. He was chief research engineer.

OBITUARIES...

Edward J. Maxa, 51, chief purchasing agent, **Chicago Extruded Metals Co.**, Cicero, Ill., died Feb. 5.

Henry Marx, 101, who retired in 1959 as chairman of **G. A. Gray Co.**, Cincinnati, died Feb. 8.

J. A. Elwood Sr., 68, vice president, **Simplex Machine Tool Co.**, Milwaukee, died Feb. 7.

Girard E. Bircke, supervising purchasing agent, **Watervliet Arsenal**, Watervliet, N. Y., died Jan. 30.

Frank D. O'Neil, 58, sales representative for **Allied Steel Castings Co.**, Harvey, Ill., died Feb. 6.

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IT was normal, but not easy, for Carlson specialists to handle this big plate. Type 304-L stainless, it measured 7/16" x 131½" x 452 9/16" and weighed an impressive 7923 pounds. And when this big one landed at the customer's receiving dock it was *exactly* what he wanted . . . *right* by chemical composition, *right* by physical standards, *right* to specification and *right* to size.

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8-Hi Unitrol packs more control into less space

Each *side* of a single Unitrol *section* will hold *eight* size 1 control units . . . or *five* size 2 units . . . or *four* size 3 units. And these are *NOT* "stripped-down" units. The new compact design provides space for optional components such as control circuit fuses, control transformer, terminal boards, three-coil overload relays, and pushbuttons and indicating lights.

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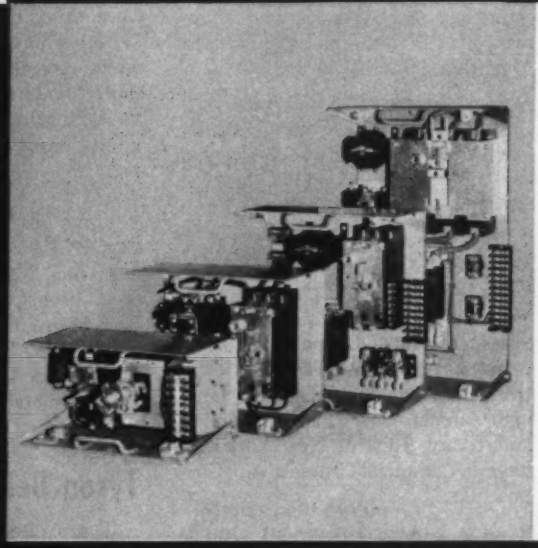
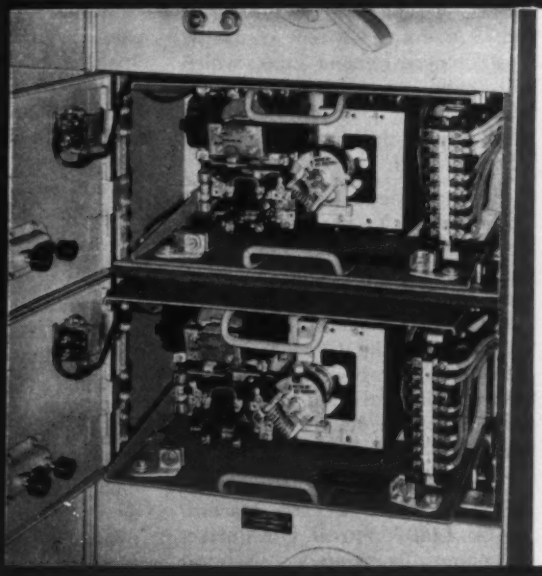


8-Hi Unitrol offers extra control center flexibility

Control units for the new 8-Hi Unitrol are available in both the standard and new compact design for maximum selectivity and flexibility. Add to this the modular construction and see how easily the control units can be combined to create a flexible, space-saving control center. On-the-job modifications are easily made . . . 8-Hi Unitrol keeps pace with changing requirements.



8-Hi Unitrol is easier, safer to install

Available in types A, B, and C construction with Class 1 or 2 wiring, you can select the 8-Hi Unitrol that affords the greatest installation economy. Cost-cutting, time-saving features include U-shaped control units assure wide-open visibility . . . no buried components. "Safety-lock" test position insures safe wiring and testing. "Plug-in" power contacts are self-aligning . . . no hazardous manual adjustments.

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Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.; Intercontinental Electronics Corporation.

U. S. Firms Seek Larger Share of World Markets

METALWORKING firms are making a determined effort to recapture their share of foreign trade. Since World War II, exports of many metalworking products have dropped substantially, while imports have made considerable gains.

The migration of U. S. metalworking capacity to foreign countries continues at a fast pace. Direct investments in foreign facilities have more than doubled since 1950. A survey conducted last year by the National Machine Tool Builders' Association (STEEL, Nov. 30, 1959, p. 63) revealed that 31 per cent of the participating builders have foreign capacity; 16 per cent more had plans underway at that time to manufacture abroad. Another tack being taken by an increasingly large number of firms: The signing of agreements with companies abroad for exchange of technical assistance, for the supply of components, and for manufacturing rights. Recent announcements:

• Lee Wilson Engineering Co., Cleveland, and its European licensees have formed Lee Wilson Engineering Co. SA, Fribourg, Switzerland, to co-ordinate sales and manufacturing facilities for the open coil process of gas alloying and annealing in the European Common Market and the Free Trade Area. The new office will be managed by V. J. Gibbons.

• Gabriel Co.—This Cleveland firm joined Van Der Hout Associates Inc., Toronto, Ont., in establishing Gabriel of Canada Ltd. to manufacture shock absorbers and other related automotive products.

• Kaiser Aluminum & Chemical Corp.—This Oakland, Calif., firm joined Delta Metal Co. Ltd., Birmingham, England, in organizing James Booth Aluminium Ltd., succeeding James Booth & Co. Ltd. Kaiser will invest $14 million, half of the initial capitalization of the aluminum fabricating company. All the funds will be used to expand Booth's Kitts Green Works, Birmingham.

• Deere & Co.—This Moline, Ill., firm organized Compagnie Francaise John Deere to build and operate a tractor plant in France. Deere is also manufacturing farm equipment in Germany and Mexico, and is building a plant in Argentina.

• Ford Motor Co.—Through its Canadian subsidiary at Toronto, Ont., this company will build a car and truck assembly plant at Salisbury, Southern Rhodesia. Total investment: $3.5 million.

• United Aircraft Corp.—This firm's Hamilton Standard Div., Windsor Locks, Conn., formed a Swiss company, Corpuscular A.G., to market the Hamilton-Zeiss electron beam machine outside the U. S. and Canada. Carl Zeiss Foundation and Irving Rossi of New York also have a financial interest in Corpuscular.

• Dow Chemical Co.—Its subsidiary, Dow Chemical International Ltd. S.A., formed a new company, Dow Chimica Italiana S.p.A., which will build a multimillion dollar manufacturing plant in Italy. The subsidiary is opening a marketing office in Milan.

• Hartman Metal Fabricators Inc., Rochester, N. Y., has formed Hartman Metal Fabricators Ltd. which has taken over the plant and assets of Welded Products Ltd., Caledonia, Ont. Hartman products now manufactured in Canada include heavy duty storage and pallet racks, electromechanical adjustable power docks, portable self-dumping hoppers, and industrial containers.

• Textron Inc.—This Providence, R. I., firm acquired Terry Machinery Co. Ltd., Montreal, Que., maker of pumps, generators, electronic systems, and chain saws.

• Raytheon Co.—This Waltham, Mass., firm has signed an agreement under which it will exchange technical knowhow with Compagnie Generale de TSF, Paris, France. Research and development work will center on the microwave tube field.

• National Lead Co., New York, and Companhia Industrial e Commercial Brasmotor, Sao Paulo, Brazil, have formed a company to manufacture zinc and aluminum diecastings. The new company, Industrias Doehler do Brazil S.A., is operating a plant at Sao Bernardo do Campo, Brazil.

• Babcock & Wilcox Co., New York, signed an agreement with Cantieri Riuniti Dell'Adriatico (United Shipyards of the Adriatic) which permits the Italian firm to build and sell merchant vessels powered by nuclear propulsion plants based on B&W designs and patents.

• Loma Machine Mfg. Co. Inc. and its subsidiary, Lobeck Casting Processes Inc., New York, have concluded a licensing agreement with Albert Mann Engineering Co., Basildon, Essex, England. The agreement facilitates the supply of Loma-Lobeck metal processing equipment on a basis of British construction.

Tyson Bearing Expands

Tyson Bearing Co., Massillon, Ohio, has launched a $2 million expansion project involving additions to plant and equipment. Tyson is a division of SKF Industries Inc., Philadelphia. Completion of the project will enable Tyson to almost triple tapered roller bearing production in sizes ranging from 4.5 to 6 in. OD.

Metal Firms Change Names

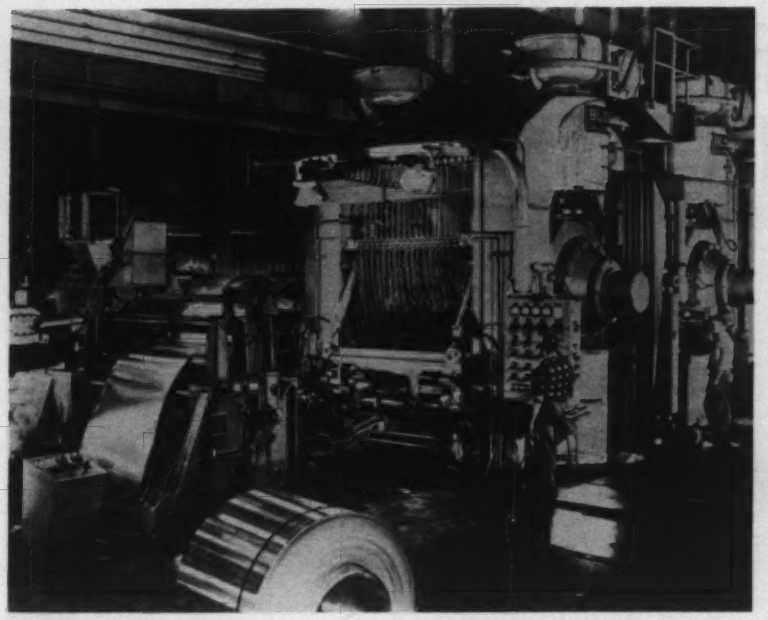
Several metalworking firms have recently changed their corporate names. They include:

Union Tank Car Co., Chicago, changed the name of its Graver Tank & Mfg. Co. to Graver Oil & Gas Equipment Co., Sand Springs, Okla. Charles B. Briggs is president of the new division; E. G. Vail remains as plant manager and C. P. MacDonald as manager of sales.

Cincinnati Pump & Mfg. Co. Inc. to General Chain & Mfg. Corp., Cincinnati.

National-U. S. Radiator Corp. to Natus Corp., New York. (Operating assets of the company were recently purchased by Crane Co.)

Vanguard Engineering Co. to Vanguard Mfg. Co., Cleveland.



FOUR HIGH, TWO STAND TANDEM COLD REDUCTION MILL at Olin Mathieson Chemical Corp.'s new plant at Omal, Ohio, delivers aluminum in gages as thin as 0.012 in. The plant's four hot and cold reduction mills built by the Rolling Mill Div., E. W. Bliss Co., Salem, Ohio, have a monthly capacity of some 10 million lb of flat aluminum products. Gages range from slab and plates down to 0.006 in. strip in widths up to 66 in. Plate widths can go to 90 in.

CONSOLIDATIONS

Continental Copper & Steel Industries Inc., New York, acquired the newly formed **Technitron Corp.** and is establishing development and production facilities at Union, N. J. Production will include electronic equipment and components.

Aluminum Co. of America, Pittsburgh, acquired **Cupples Products Corp.**, St. Louis. The company fabricates and installs aluminum doors, window frames, and curtain walls. It also manufactures other aluminum products, including highway railing.

Albion Malleable Iron Co., Albion, Mich., and **Muncie Malleable Foundry Co.**, Muncie, Ind., have merged. The Muncie foundry will function as a division of the Albion firm.

Woodruff & Edwards Inc., Elgin, Ill., purchased **Richmond Foundry & Mfg. Co.**, Richmond, Va., and will operate the property as a division.

Minneapolis-Moline Co., Hopkins, Minn., purchased **John Morrell Mfg. Co.**, Elgin, Ill., maker of electric fork lift trucks. The Elgin firm will be operated as a subsidiary.

Howe Sound Co., New York, acquired **Triplett & Barton Inc.**, Burbank, Calif., manufacturer of x-ray equipment.

NEW ADDRESSES

Simplex Machine Tool Corp. will move Apr. 30 to a 21,000 sq ft plant in Menomonee Falls, Wis. Arrow Tool & Stamping Co., Milwaukee, has purchased the Simplex plant at 4548 W. Mitchell St., that city.

Raytheon Co., Waltham, Mass., moved its New York area commercial sales offices to 210 Sylvan Ave., Englewood Cliffs, N. J. D. B. Whittemore is regional commercial manager.

Pako Corp. moved to 6300 Olson Memorial Highway, Minneapolis 40, Minn. The firm makes x-ray and photographic film processing machines.

ASSOCIATIONS

American Society of Tool Engineers, Detroit, changed its name to American Society of Tool & Mfg. Engineers.

Alloy Casting Institute moved its headquarters from Mineola, N. Y., to 1001 Franklin Ave., Garden City, N. Y.

American Institute of Mining, Metallurgical & Petroleum Engineers Inc., New York, has installed these officers: President, Dr. J. L. Gillson, E. I. du Pont de Nemours & Co., Wilmington, Del.; president-elect, R. E. McNaughton, Consolidated Mining & Smelting Co. of Canada Ltd., Trail, B. C.; vice presidents, Dr. John Chipman, Massachusetts Institute of Technology, Cambridge, Mass.; J. W. Woomer, consultant, Pittsburgh; S. D. Michaelson, Kennecott Copper Corp., Salt Lake City, Utah; B. P. Kantzer, Union Oil Co. of California, Los Angeles; J. P. Hammond, Amerada Petroleum Corp., Tulsa, Okla.; and Dr. W. R. Hibbard Jr., General Electric Co., Schenectady, N. Y.

Clifford J. Hicks has been named assistant secretary of the AIME. He is also western field secretary with headquarters in Salt Lake City, Utah.

Society of Mining Engineers, AIME, installed these officers: President, Dr. A. B. Cummins, Johns-Manville Corp., Manville, N. J.; president elect, J. C. Gray, U. S. Steel Corp., Pittsburgh; and vice president, H. C. Weed, Inspiration Consolidated Copper Co., Inspiration, Ariz.

Metallurgical Society, AIME, installed these officers: President, Dr. C. C. Long, St. Joseph Lead Co., Monaca, Pa.; president-elect, and vice president, J. S. Smart Jr., American Smelting & Refining Co., New York.

National Constructors Association, New York, elected D. W. Darnell, Fluor Corp. Ltd., Los Angeles, president, and R. L. Cashen, H. K. Ferguson Co., Cleveland, vice president.

Everything new but the shape

Ever since man discovered the wheel, he has been working at new ways to use it. The latest use of the wheel is in the jet turbine. These turbine wheels and compressor wheels, forged in massive closed dies from materials unknown a few years ago, make possible the outstanding performance records of our American engines.

Helping wheels turn—on the ground—on the sea—in space—is all part of Wyman-Gordon's business. Where performance depends upon stamina, there is no substitute for a forging—and in a forging there is no substitute for Wyman-Gordon experience, quality and dependability.

WYMAN-GORDON

FORGINGS

of Aluminum Magnesium Steel Titanium . . . and Beryllium Molybdenum Columbium and other uncommon materials

HARVEY ILLINOIS · WORCESTER MASSACHUSETTS · DETROIT MICHIGAN

GRAFTON MASSACHUSETTS · FRANKLIN PARK ILLINOIS · LOS ANGELES CALIFORNIA · FORT WORTH TEXAS

PORTABLE OXYGEN MAKER—A device that operates on house current starts extracting oxygen at 5 psi from the atmosphere less than 1 minute after it's turned on. Called AerOxy-Gen, it weighs about 150 lb and takes up about 2 sq ft of floor space, says Aerojet-General Corp., Azusa, Calif., a subsidiary of General Tire & Rubber Co. Uses include welding and cutting.

BOOSTING STEEL STRENGTH—An ultrahigh strength steel (Unimach UCX2) developed for rocket motor cases has a yield strength of 225,000 to 235,000 psi. When properly tempered, the alloy shows practically no notch sensitivity, claims Universal-Cyclops Steel Corp., Bridgeville, Pa. It forms well and has good welding characteristics. C. C. English, manager of high temperature metal sales, expects use of the alloy to reduce production costs.

COIL COMPUTER—A Univac computer calculates complete design specifications and prints a coil drawing with dimensions, bill of material, and other design information, Westinghouse Electric Corp. engineers told a meeting of the American Institute of Electrical Engineers, New York. All that's needed are the service characteristics which must be fed into the computer.

URANIUM ALLOY STEEL—A carbon steel containing uranium has been experimentally developed by the Canadian Department of Mines & Technical Surveys and Eldorado Mining & Refining Co., Toronto, Ont. Results indicate the development may bring these benefits: 1. More refined, low grade steels. 2. Increased tensile. 3. Improved fatigue resistance. 4. Increased corrosion resistance.

SPARK HARDENING—Metal surfaces can be hardened by an electric spark. Reason, in part: Nitrogen in the atmosphere, says N. C. Welsh, Associated Electrical Industries Ltd., Aldermaston, England. He adds: Spark treatment has been successful in Russia as a practical process for surface hardening. Wear tests are said to demonstrate its potential on nonferrous metals.

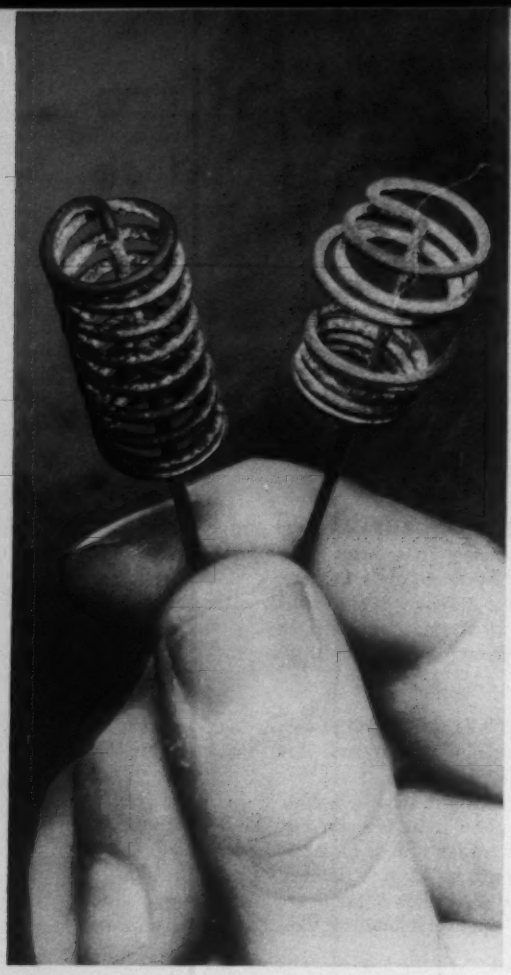
SENSITIVE PICKUP—A semiconductor as small as a whisker has been developed by Electro-Optical Systems Inc., Pasadena, Calif., and the Picatinny Arsenal, Army Ordnance Corps, Dover, N. J. It is said to be 50 times more sensitive than regular metallic strain wires.

POLYETHYLENE BOOST— A method for making powdered polythylene now makes it possible to apply the material to heated metal parts by dipping into an aerated bed of the powder (fluidizing). The material can also be used to make large moldings (Engel process). Production starts next month at U. S. Chemicals Co., a division of National Distillers Chemical Corp., New York, later at Spencer Chemical Co., Kansas City, Mo.

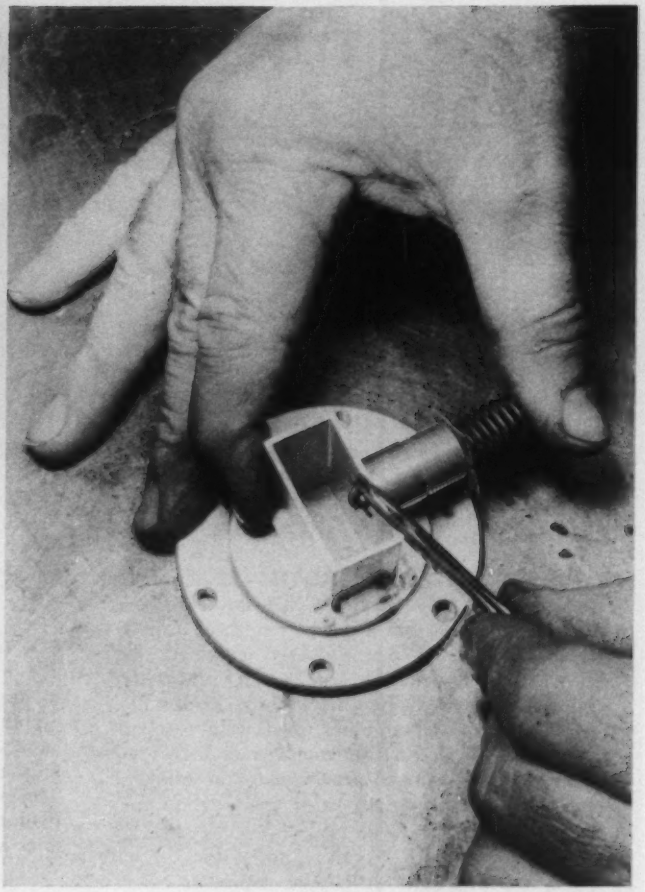
R&D MONEY—The National Science Foundation estimates over $12 billion will be spent on research and development in 1960, an increase of 140 per cent above 1953. You can get details on how the money will be spent by writing the foundation for bulletin No. 16 at NSF, Washington 25, D. C.

GLASS-IN-PLASTIC PIPE— A glass reinforced, plastic pipe withstands temperatures from minus 40 to 300° F. The resin, developed by Esso Research & Engineering Co., New York, is said to be extremely resistant to water and oil. The firm expects it to improve the piping situation in oil producing fields.

BRITISH BERYLLIUM—A new beryllium plant in England will turn out 7 to 10 tons of wrought product a year, says Imperial Chemical Industries Ltd. The firm imports raw material and melts it in a vacuum induction furnace. Part of the output will be used in the UK Atomic Energy Authority's experimental gas cooled reactor.



NS-25 spring (left) can be used after several hundred cycles. Stainless (right) is limp after one cycle



Threaded collar is held against rectangular waveguide tube by slipping a small wire through hook in spring end

Superalloy Springs Survive Brazing Heat

They retain shape and tension after hundreds of dips in 1100 and 1400° F salt baths. Brazing of complex microwave assemblies is simplified, faster, and more precise

ANOTHER Jet Age wonder alloy has proved its worth in handling everyday metalworking problems. It's a good example of how you can save money on a process by spending more for the material.

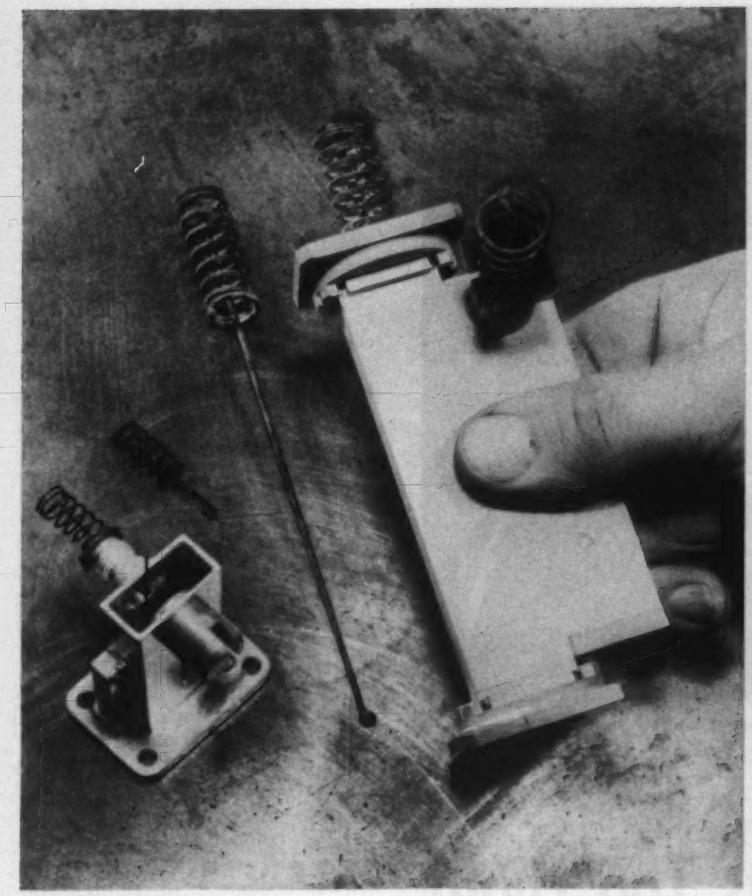
In this case, the material is Haynes Alloy No. 25, a product of Haynes Stellite Co., Kokomo, Ind., a division of Union Carbide Corp. It is being fabricated into spring wire by National-Standard Co., Niles, Mich., and in that form is known as NS-25.

As a wrought product, the cobalt-base alloy exhibits its high temperature strength in such applications as afterburner sheets, turbine rings, and nozzle vanes in jet engines. As spring wire, it has solved the difficult job of clamping parts for brazing at 1400° F.

• The superalloy springs are "good as new" after hundreds of uses.

That's the report STEEL got from N.R.K. Mfg. & Engineering Co., Chicago, producer of microwave assemblies and radar components. Manufacturing is simplified, faster, and more precise than it formerly was.

Until spring materials that would retain tension while immersed in brazing baths were available, N.R.K. had to use cumbersome weights, intricate fixtures, and tack-welding to hold assemblies together. The firm wanted springs to hold brass parts during 1400° F silver brazing and at a lower temperature



Plates, round tubes, and circles are held to rectangular tube by springs with ends passing through cavity. Notched plates slip over bulb on spring end

After preheating at 1000° F, complete assembly is dipped in salt bath

(1100° F) for brazing aluminum parts.

The spring assembly technique had been impractical for brazing brass parts until NS-25 springs were tried because no spring material available would retain tension at the temperature required. Although springs were available for 1100° F aluminum brazing, the technique was costlier because the springs used deformed quickly. They had to be reshaped after each use and had to be replaced after 60 to 70 brazing operations.

• The mechanical stability of the NS-25 spring wire insures proper expansion of the parts during heating.

If spring tension is too great, the brazed parts will deform under the spring load. If the tension is inadequate, the mating parts will not make good contact and an imperfect bond will result. Typical tolerances on dimensions of complex microwave assemblies after brazing are plus or minus 0.002 in.

Parts to be brazed are assembled and held in place by the superalloy springs. Typically, one end of the spring bears directly against a small plate that squeezes down on the parts. The other end of the spring is brought through the center of the helix and out through the other end. That end of the spring is secured by slipping a notched plate over a knob on the spring end.

During assembly, a shim of brazing material may be placed between the parts, or a liquid brazing compound may be applied at the junction. The assemblies are then hung on hangers or set in perforated baskets. They are preheated at 1000° F for 15 to 30 minutes, then immersed in a salt bath for a few minutes to be brazed.

• Assemblies may be rapidly quenched or slowly cooled after leaving the salt bath.

Parts are washed in warm water to remove the corrosive flux picked up in the bath. The NS-25 springs are removed after washing and returned to the assembly bench for re-use.

Further recoiling or other processing operations are not required.

The cost savings due to use of the springs vary considerably, depending on the length of run and the complexity of the assembly. N.R.K. has standardized on NS-25 springs for all jobs where spring fixturing is used (from long production runs to pilot runs or special orders for one unit) because of the savings and improved precision they have made possible.

Many spring sizes and shapes have been designed for many hundreds of brazing problems.

Special wrench made for use with an air impact tool

Hand Tool Costs Too High?

Annual expense often is much greater than you'd expect. Proper selection can mean improved maintenance, resulting in reduced downtime on the production line

DOES your company pay enough attention to the purchase of inexpensive products, such as hand tools used on the production line or by the maintenance department?

First, the amount of money involved can be substantial. A truck assembly plant employing 2000 estimates its annual expenditure for hand tools at $10,000 to $25,000. A large metal producing plant says it had an initial outlay of $30,000 to $40,000 and spends $7000 a year for replacements. A maker of welding goods figures he spends about $2000 a year for such tools as wrenches and screw drivers.

Second, hand tools can be expensive in another sense: Improper tools cause accidents. They damage screws, nuts, and expensive parts. They can create excessive downtime. And they break easily.

STEEL (with the aid of Snap-On Tools Corp., Kenosha, Wis.) has worked up a list of ways that proper hand tools can help you cut costs:

• Proper tools reduce replacement costs.

An auto manufacturer reduced small tool costs 87 per cent by using a slightly higher priced socket. A socket which cost $1.35 wore out after tightening 10,500 bolts. The socket which cost $1.65 turned 112,000 bolts. In that instance, tool quality and choice of correct tool were the major factors.

Variations in heat treatment and metallurgy can often increase the value of a tool far above any increased cost, states Ray Knudsen, chief engineer at Snap-On Tools. He cites one case where a modified heat treatment of a socket wrench saved a railroad car manufacturer several hundred dollars and increased the life of the tool from 12 to 65 shifts. Cost saving: 80 per cent.

Many plants are cutting expenses by repairing rather than scrapping worn tools. Gordon Thompson, service manager at the tool company, points to these examples: Screw drivers (replace worn blade), 60 per cent saving; ratchets (replace moving parts), 55 per cent saving; cutting pliers (resharpen), 70 to 80 per cent saving.

• Proper tools reduce maintenance manhours and downtime.

U. S. Steel Corp. cut downtime 90 per cent in changing bearings on a 100 in. plate mill pinion stand by using a special 10⅝ in. hex socket. Formerly, four men did the job with an open end wrench and dolly bar in 2½ hours. With the special socket and an impact wrench, the job can be done in 15 minutes. Mill downtime is rated at $700 an hour; the saving on each job is over $1500 in downtime alone.

A maintenance engineer estimates he saved $10,000 the first year he outfitted his men with Roll-Cabs (mobile carts which contain all the tools a maintenance man is likely to need). Having the tools where and when they are needed is the only way to insure a worker will use the correct tools.

Milton Steinmetz, industrial sales manager at Snap-On Tools, says that cost saving possibilities in bolt turning maintenance operations are often overlooked by management (as compared with production bolt turning where cost saving opportunities are more obvious and easier to pin down).

In a medium sized petrochemical plant with nearly 200 maintenance mechanics, engineers estimate that 30 per cent of a mechanic's time is spent directly in bolt turning operations. Another 20 per cent of his time is spent in travel to and from shops for needed tools and

parts. The cost of keeping the mechanic on the payroll is $3.50 an hour.

• Proper tools increase production and reduce the reject rates.

Bendix Aviation Corp. boosted production 18 per cent by using a plier designed to do two operations. Westinghouse Electric Corp. increased the speed of an operation on its packaging line three and a half times with an impact wrench. Yearly saving: $400—four times the cost of the tool.

A manufacture of electronic components traced a significant number of rejects to loose hardware and extraneous material in the parts. Causes: Inadequate wrenches (worn, wrong size), lack of torquing, and loose wire cuttings. Solution: A tool kit for each assembly worker which included all wrench sizes needed, a torque wrench, socket wrenches, screw drivers modified for use with torque wrenches, and cutting pliers with plastic jaw inserts to retain wire cuttings.

• Proper tools reduce accident rates.

Hand tools are a factor in 6 to 7 per cent of all industrial accidents. Several accidents at an oil refinery were caused by the use of sledges used for driving wrenches in close quarters. The hazard was eliminated by the use of a special wrench which is driven with an air hammer.

Norton Co., a grinding wheel manufacturer, observes that one-third of all grinding wheel accidents are traceable to overtightening and undertightening of flange screws. The use of torque wrenches is the only answer.

An added bonus which comes through use of better tools is improved employee morale. Proper tools are easier to use. They appeal to the pride of a good mechanic and assure him of doing a job well.

Final word: "It's the mark of a good executive to delegate authority. But it's also the mark of a good executive to backtrack occasionally and check up on the results of delegated authority—particularly in those areas that may seem to require little executive judgment. You may find that the little things—like hand tools—are costing more than you realize," points out Rogers Palmer, vice president, marketing, at Snap-On Tools.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Standard socket wrench with spinner handle being used on cover of crane winch housing

Grinding Speedup Slashes Slab Conditioning Costs

Faster grinding reduced stainless steel slab conditioning costs 25 per cent per pound of metal removed in tests at Simonds Abrasive Co., Philadelphia. Possible savings: $10 to $12 a ton.

Grinding speed was 12,300 sfpm vs. a normal 9500 sfpm. Hot pressed snagging wheels (24 in. by 3 in. by 12 in.) were used because of their strong, dense construction and ability to withstand the higher speed.

The slabs (300 series stainless) were 12 to 14 in. wide, 2 in. thick, and up to 30 ft long.

For safety, the billet grinder was equipped with a heavy duty guard which covered as much as 70 per cent of the wheel.

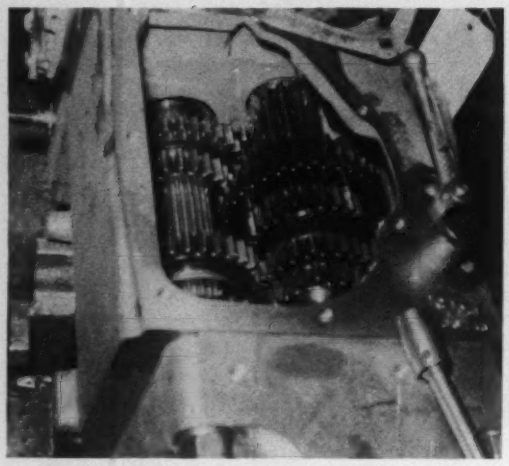
Nuclear Laboratory Installs Rolling Mill

A heavy duty rolling mill has been added at the Nuclear Components Development Laboratory, Westinghouse Electric Corp., Cheswick, Pa. The expansion will provide more development and production facilities for fuel elements and core components used in the atomic power industry.

The laboratory will be available to government and industrial customers for evaluation programs for pilot and full production on nuclear fuels and materials. Initial work will be directed at improving uranium oxide fuel element fabrication and uranium alloy fuels clad in such materials as zirconium, aluminum, columbium, molybdenum, and stainless steel, produced in plate, rod, or tubular form.

• Rolling Mill—The mill (made by Loma Machine Mfg. Co. Inc., New York) is normally operated in either a 6 x 8 in., two high setup or a 1½ in. and 6 x 8 in., four high setup. The two high arrangement is used for hot or cold breakdown rolling of plates and sheets. Grooved rolls are used to process rounds, squares, and other shapes. In the four high setup, strip is cold finish rolled to gages as thin as 0.001 in. By moving the outboard mill housing, the machine can handle rolls 10 in. wide.

Transmission Problem Solved . . .



PROBLEM: Make this transmission for a John Deere tractor carry a bigger load without enlarging the case

SOLUTION: Weld two gears into one cluster gear; use space saved to beef up construction. Fixture holds assembly during welding

Assembling a cluster gear from several pieces replaces one-piece style—increases strength, wear resistance, stays within space limitations of the old transmission case

A SWITCH from one piece to welded cluster gears is saving thousands of dollars annually for Deere & Co., at its Dubuque, Iowa, plant.

Fabrication of multiple faced gears from a single piece of bar stock or a forging is the common, straightforward approach used by most designers. But making them from a few pieces can save time, material, and improve physical properties, claims Dan Mihal, project engineer at Deere & Co., whose work won a prize in the current Machine Design Award program of the James F. Lincoln Arc Welding Foundation, Cleveland.

• Deere's redesign was needed to permit power increases in tractors without a major tooling and engineering program.

The gears described by Mr. Mihal are made of AISI 5140H HR forgings. That alloy was chosen because it can be hardened inexpensively with a shallow case carbonitriding, yet it retains a core of sufficient strength to back up the case.

Despite the power boost, the old design on the first cluster gear could have been improved anyway, Deere engineers felt. They noted some involuntary disengagement under heavy loads, occasional reports of freezing to the shaft, an inadequate bore length which gave the gears an unstable mesh, and excessive deflection under load.

To eliminate those problems: Gears had to be made wider to increase beam strength and wear resistance. In addition, time to put new parts into production had to be held to a minimum; the new design could not complicate repair and replacement; and costs had to be kept low.

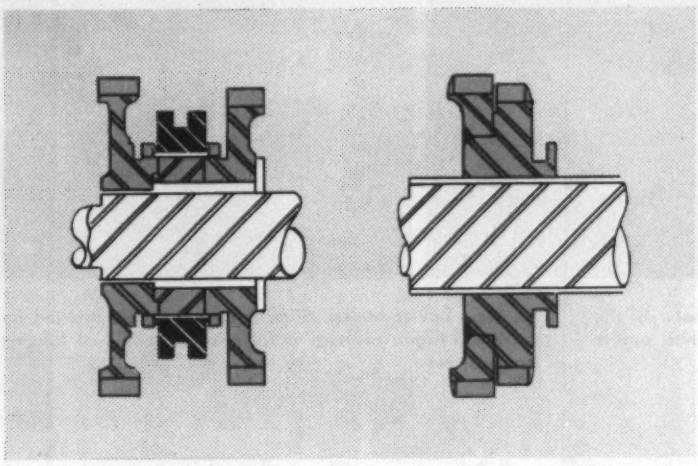
"A welded assembly seemed the only way to use all the available space in the existing transmission case. It also met other conditions we had to face," states Mr. Mihal. He adds:

"A cost comparison will give you an indication of how well the switch succeeded. The old design (ten parts) cost $21.52 per transmission. The new one (five parts) costs $17.53 per transmission. That adds up to about an 18 per cent saving."

• Correct processing is as important as design when considering welded gears. They can be mass produced in a controlled and predetermined sequence. Much depends on operator skill.

Ultimate quality, Deere finds, depends on correctly finishing each

by Welded Gears



ADVANTAGES: New design (right) displays greater shaft contact and wider web and teeth which increase rigidity and gear strength

operation. Otherwise, final use of the gear will be drastically affected.

The heat treatment is an isothermal annealing. Forgings are austenitized at 1650° F for 1 hour, then dropped to 1200° F for 1 hour and air cooled. That relieves forging stresses and produces a top rate hardness and a microstructure which machines well.

After machining, the gears are carbonitrided, then tempered at 425° F and grit blasted to remove scale. Parts have a 0.006 to 0.007 in. case with good through hardness. Surface Rockwell is C 50 to 60; the core is C 50.

• Successful welding took some research, but the technique represents the best compromise for consistent results. Separate procedures are needed for each type gear.

Weld joints must be absolutely clean. Parts are preheated for 1 hour at 800° F and loaded on an Aronson positioner. Shields prevent weld spatter on face and bore. A $\frac{3}{8}$ in. tackweld is first, followed by cleaning, inspection, and a complete weld on the opposite face. The weld starting point is cleaned before overlapping.

Deere uses a 3/16 in. E7018 iron powder low hydrogen rod at 240 amperes.

A final postheating at 800° F (in the same preheating furnace) prevents martensite formation during weld cooling. Gears are finally air cooled.

• Performance records show that this gear and three others of similar design are adequate for the job.

The first gear was first installed in a transmission in June, 1957. Some 23,000 have been produced since that time.

A second design was adopted in May, 1958. About 12,000 have been made since then.

A third and fourth example were put into production in September, 1958. Since then, 3700 gears have been made.

Tempering Process Improves Castings

Patented thermal operation reduces processing failures and permits design flexibility

ALLOY STEEL and other castings are improved by a process called Determinant Tempering, says the developer, Eimco Corp., Salt Lake City, Utah. It's used as an intermediate step before heat treatment as normally practiced.

• **Benefits** — Eimco reports: "The process eliminates cracking due to initial cooling stresses, making complex alloy steel castings designs more readily castable; eliminates cracking due to flame cutting, grinding or other mechanical or flame processes; improves impact resistance, effective yield strength, fatigue life, weldability, and hardenability."

• **Application**—It helped make possible the unitized "stress flow" construction incorporated into Eimco's 100 hp, 103 crawler-tractor series. Members formerly assembled with bolts or welds are cast in one piece. Besides crawler-tractors, Eimco makes mining equipment and other heavy industrial products.

• **Procedure**—Castings are sand or mold cooled in the conventional manner to just below red heat, after which they are subjected to the usual shakeout operation. They are then immediately transferred in the rough to a car or batch type heat treat furnace already operating at a suitable temperature to complete pearlite transformation. Castings are then air cooled to room temperature and subsequently processed in the conventional manner.

Engineer Wins Award

Frank S. Block, supervisory chemical engineer at the Bureau of Mines's research center, Albany, Oreg., is the recipient of an Arthur S. Fleming Award for several contributions to metallurgy including the creation of a process to separate columbium and tantalum.

Black graphite cloth, hooked to copper bus bars, is the heating element in this brazing chamber. The white, quartz cloth is an insulator

The steel box is sealed, filled with argon, and readied for brazing. Argon prevents burning of materials at brazing temperatures

Graphite Cloth Speeds Heat Cycle

Used in stainless steel honeycomb brazing, the material has joined panels in as little as 9 minutes. Now, the engineers are working on other industrial applications

SURE of mushrooming demand for stainless steel honeycomb panels, aircraft production men are searching technology for easier, cheaper, and faster ways to produce them. Brazing is getting a lot of attention.

One of the big problems in brazing: The extensive time required to complete a cycle. At Rohr Aircraft Corp., Chula Vista, Calif., for example, it takes 23 hours to braze panels in the big furnaces. Early last year, Rohr engineers helped to develop an electric blanket technique that trimmed the operation to about 6 hours.

Now a steel box and some graphite cloth bid fair to cut the time to 1 hour or less.

• **9 Minute Record**—In a series of tests, the engineers brazed panels of Armco's PH 15-7 Mo with cycles as short as 9 minutes. The part is raised to brazing temperature (about 1650° F) in 3 minutes, then cooled off in 6.

Despite the brief cycle (on a panel 18 by 12 by 3½ in.), Rohr experts figure the ultimate production cycle will be about 1 hour for each panel, allowing time for brazing chamber build-up, purging, brazing, and cooling.

• **Cloth Heat Source**—Much of the credit for the new technique goes to the graphite cloth made by National Carbon Co., a division of Union Carbide Corp., New York. (See STEEL, May 11, 1959, p. 148.) The cloth is made by electrically heating a fiber or fabric such as rayon to about 5400° F.

The cloth is laid over the assembled panel. Copper bus bars, hooked to the cloth ends, supply the current.

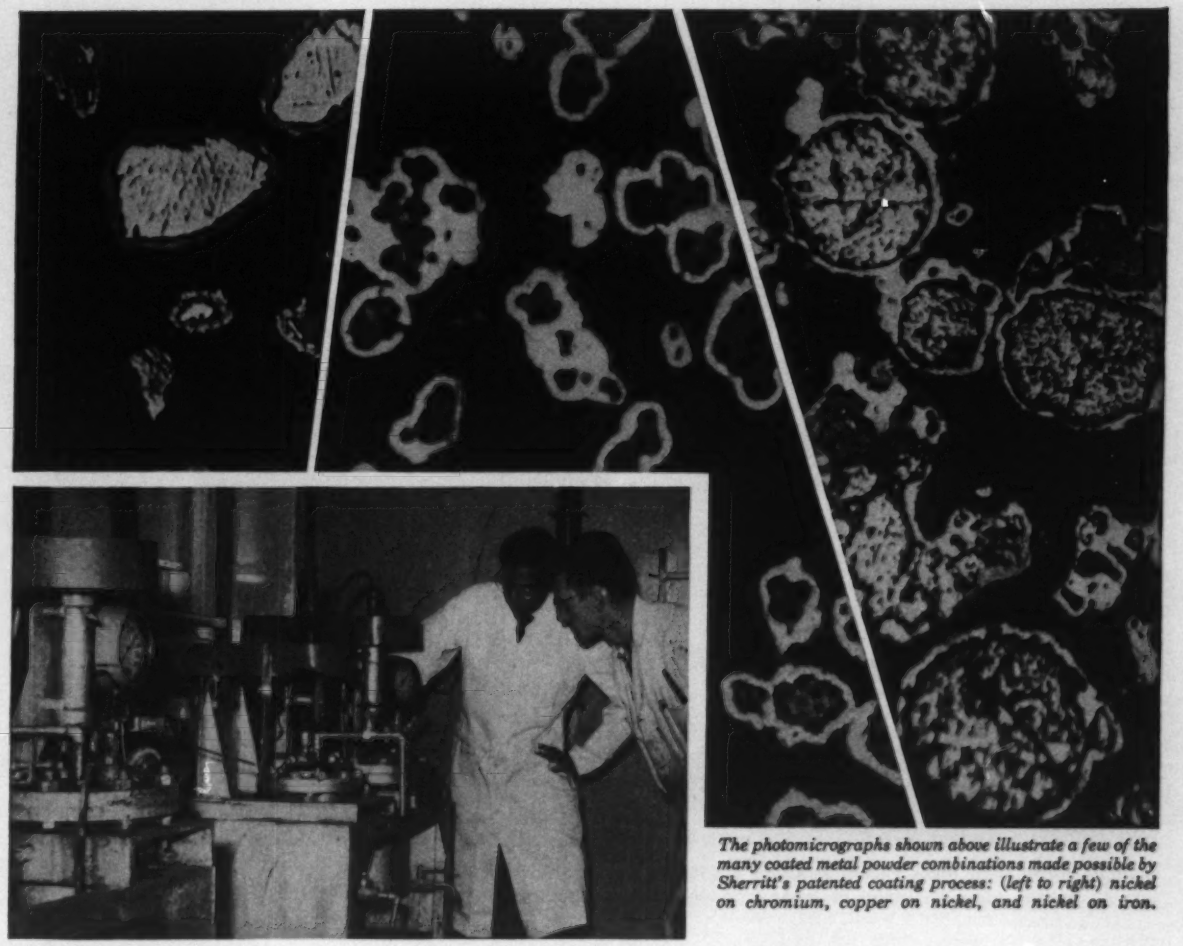
In the normal brazing cycle, the brazing chamber (a 37 cu ft steel box) is cleaned and filled with argon gas. The panel, which has been cleaned and sealed in an argon filled plastic bag, is placed in the chamber. The plastic cover is then cut away and the panel is covered with the necessary brazing components. Electrodes and thermocouples are put in position and tested, and the box is sealed.

At this time, the brazing chamber is purged and flushed with argon and the power supply is turned on.

Although Rohr engineers have had to feel their way through the tests, failures have been rare.

In one case, though, they were trying varying voltages and accidentally produced electric arcing. With the instruments at hand, the engineers couldn't record the heat generated, but they got a pretty good idea about the magnitude of the temperatures from the behavior of the stainless steel components: They evaporated.

Although the graphite cloth elements are used only for brazing so far, Rohr engineers are applying for patents on a number of other applications, probably including heat treating.



The photomicrographs shown above illustrate a few of the many coated metal powder combinations made possible by Sherritt's patented coating process: (left to right) nickel on chromium, copper on nickel, and nickel on iron.

new techniques for solid state nickel alloying

New metal coating techniques developed by the Sherritt Research Staff have greatly advanced the art of solid state alloying in powder metallurgy. These patented techniques permit controlled coating of minute metal or non-metal powders with pure nickel or cobalt.

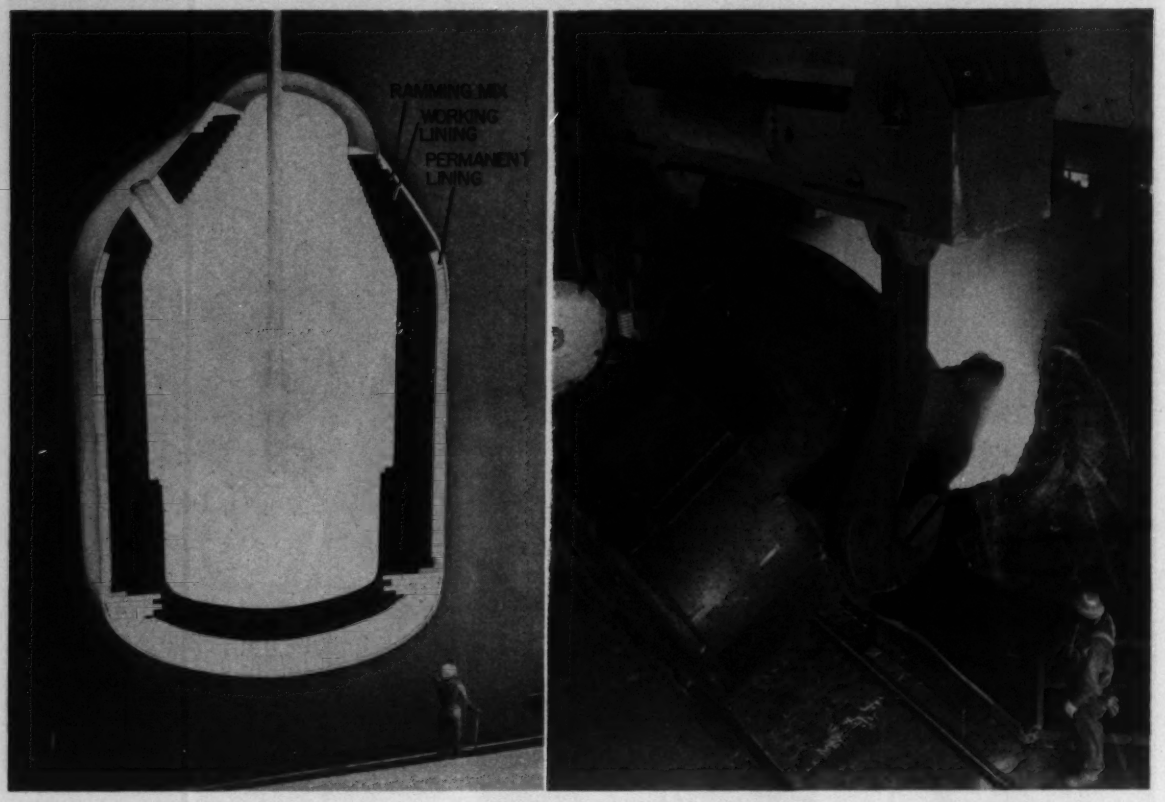
By these new techniques metal powders sensitive to oxygen contamination while in process can now be protected by a continuous coating of nickel. The coating is intimately bonded over the entire particle surface so that compacts can be produced from a completely "nickel-plated" metal powder.

Perhaps the most significant contribution of the Sherritt developments to the art of powder metallurgy is the production of the metal/non-metal combination powders. With control of the coating completely in the hands of the metallurgist, the number of possible metal/non-metal combination powders suitable for compacting applications becomes almost unlimited.

SHERRITT

FOOTE MINERAL COMPANY is the exclusive sales agent for Sherritt nickel and cobalt in the United States and Canada. For product literature, prices, and delivery information, contact the Foote Mineral Company, 411S Eighteen West Chelten Building, Philadelphia 44, Pennsylvania.

SHERRITT GORDON MINES LIMITED



Multiple lining (left) takes violent reactions for long campaigns. Hot metal is charged into an oxygen converter (right) at Jones & Laughlin's Aliquippa works

Oxygen Process Gets Boost From Refractory Research

Basic lining has played an important part in the success of converter steelmaking; researchers promise to develop better materials as they are needed

CONTINUING research programs will make better refractories available as they are needed in basic oxygen steelmaking, says Raymond E. Birch, director of research, Harbison-Walker Refractories Co., Pittsburgh.

Basic lining materials, developed for oxygen converters, have helped the vessels set production records.

• The converter process calls for refractories that protect the vessel's metal shell and give long service.

Three basic refractory materials have given satisfactory service since the basic oxygen process was introduced in the U. S., Mr. Birch says. A burned magnesite material, laid in periclase bonding mortar against the converter shell, is used as a permanent lining. Tar bonded basic brick is used for the working lining. A basic ramming mix lies between the permanent lining and the working lining. It can also be used in the working hearth.

• Popularity of the basic oxygen process has grown rapidly; steelmakers expect the trend to continue.

Developed in Austria, oxygen converter steelmaking was introduced in North America in 1954. Licensor in the U. S.: Kaiser Engineers Div., Henry J. Kaiser Co., Oakland, Calif.

By 1957, converters in the U. S. and Canada were turning out 540,000 tons of steel a year. In 1959, annual capacity was boosted to 5.5 million tons. And it's still growing. Jones & Laughlin Steel Corp. will have two, 200 ton vessels in operation at its Cleveland works in 1962; Colorado Fuel & Iron Corp. expects to produce in two, 100 ton converters at Pueblo, Colo., by late 1960. Several other steel producers are considering converters to boost their ingot capacity.

HOT STRIP MILLS

Designed and Built by MESTA

Mesta 80" Four-High Continuous Hot Strip Mill—Finishing Stands Installed at the Fairless Works, U. S. Steel Corporation

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

NATIONAL ACME'S
"ZONE OF RESPONSIBILITY"
INCLUDES ALL PHASES
OF COST REDUCTION

Check YOURS...Then Check National Acme

Direct Costs: these include direct dollar savings as realized by Minneapolis Honeywell . . . an "every day" job for Acme-Gridleys.

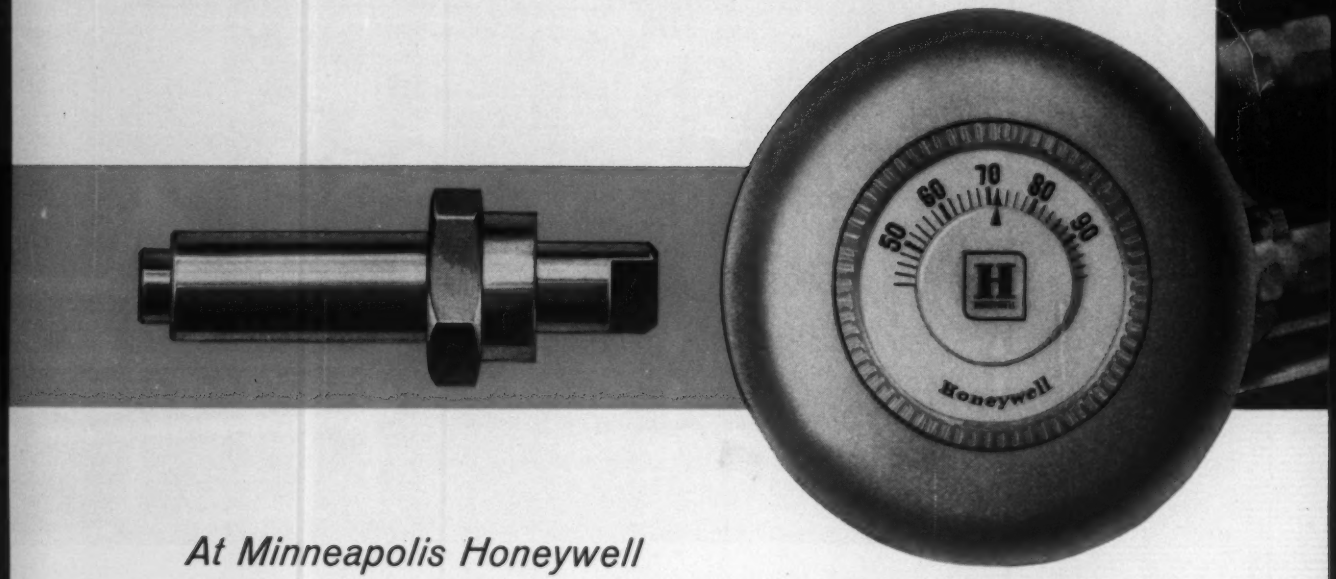
Indirect Costs: effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc.

Product Redesign: teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities.

Direct Material Costs: our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems.

Make-or-Buy Reviews: in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment.

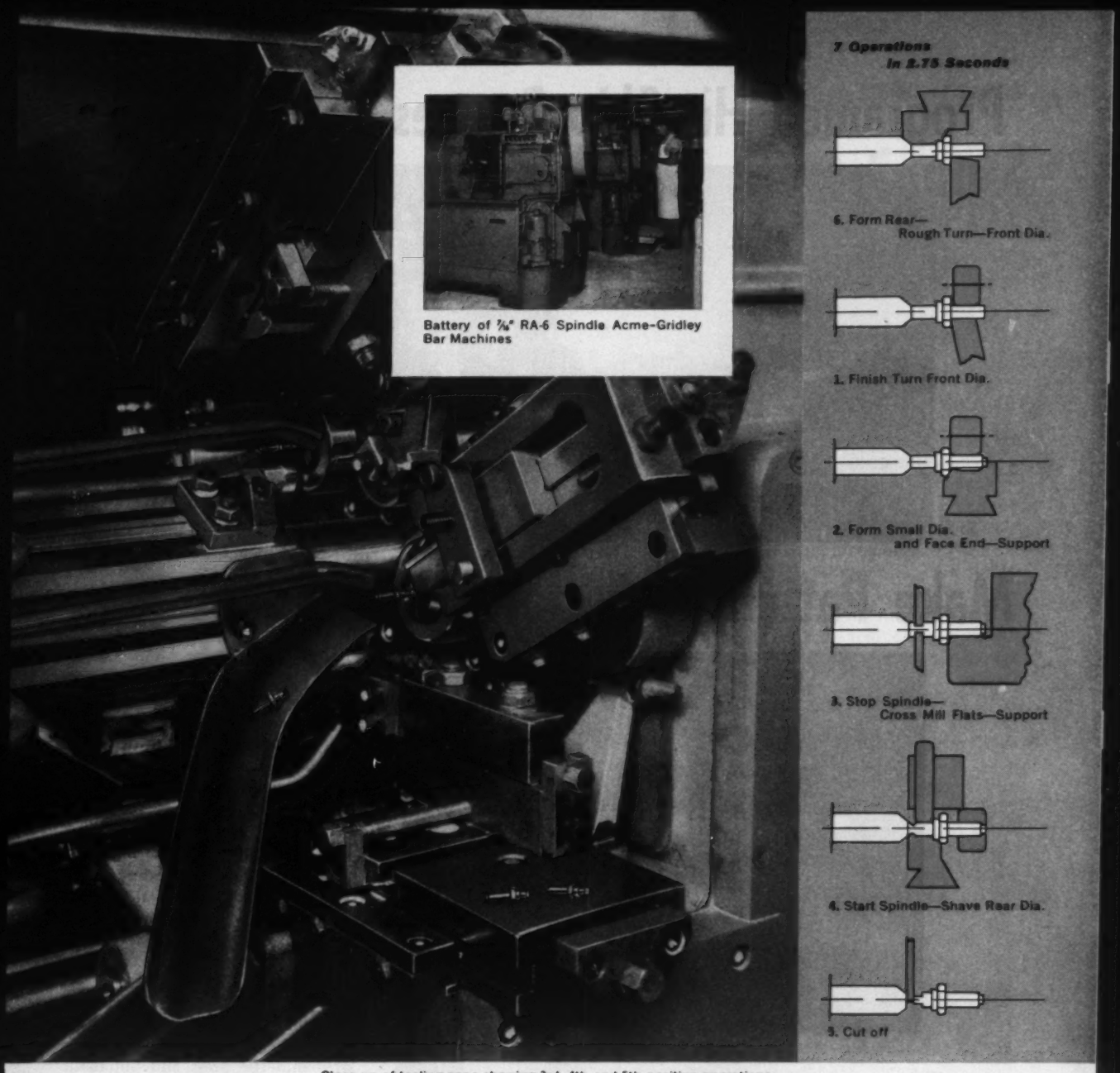
Spot Modernization: pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.



At Minneapolis Honeywell

ONE ACME-GRIDLEY REPLACES FIVE SINGLE SPINDLE MACHINES

. . . Saves 80% in Machine Hours



Battery of ⅞" RA-6 Spindle Acme-Gridley Bar Machines

Close up of tooling zone showing 3rd, 4th and 5th position operations

. . . *in addition* the reject rate is reduced 83% and operator hours per thousand slashed 92% in the production of a precision center post component for residential thermostats. What's more, with one machine, one set of tools, and one operator doing all machining in the primary setup, quality control is greatly simplified, and valuable floor space saved. Still further savings result from greatly reduced machine maintenance.

Such drastic savings are possible for Minneapolis Honeywell because of inherent Acme-Gridley features such as independently operated tool slides, the extreme accuracy and flexibility of direct camming, and wide open tooling zones. Rugged and versatile 7/16" Acme-Gridleys fit right in with Honeywell's program of "Total Machine Utilization"; will pay off for years to come by economically accommodating the materials and setups Honeywell requires in the production of small, high quality parts for their precision instruments.

Get the complete story on how Acme-Gridley Automatics provide industry's most modern approach to cost reduction. Call, write or wire.

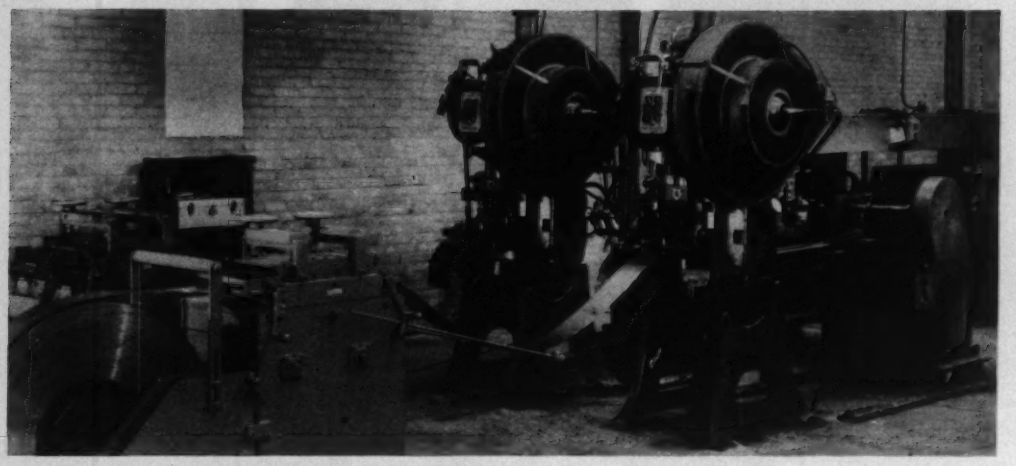
Pioneer in Circumferential Automation

National Acme

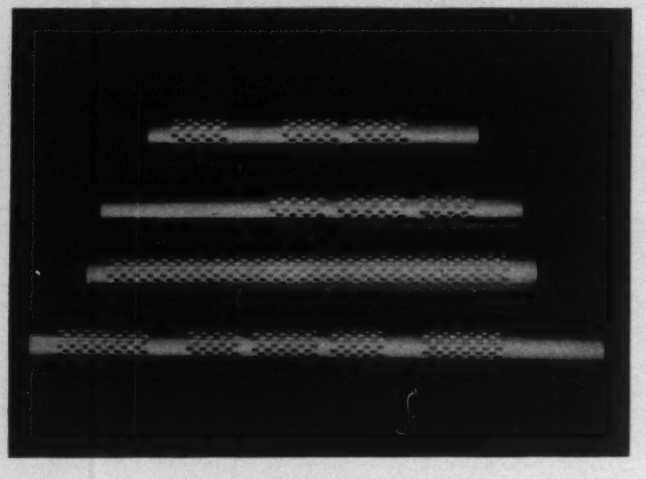
The National Acme Company
187 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N. J.; Chicago 6, Ill.; Detroit 27, Mich.

Programed Hit-Skip Presses . . .



Make Patterned Perforations



By presetting a counter at the rear of the presses, the operator can tailor the perforation-space pattern on coil stock. The parts become auto muffler tubes

NOWHERE is the cost squeeze more severe than in the highly competitive automotive replacement parts business. Makers of such parts often stake their survival on ability to pare manufacturing costs to a minimum.

At the Saco-Lowell Automotive Div., Saco-Lowell Shops, Saco, Maine, one of the jobs that defied such paring was that of making automotive muffler tubes.

The tubes are pocked by sound dispersion perforations. Sometimes the pattern arrangement is solid; sometimes it's broken by smooth spaces. In some tubes, the spaces are equal; in others the spaces vary.

• **Competitive Edge**—The problem on this job was not how to fabricate the patterns; Saco-Lowell and nearly all its competitors were doing the job efficiently. The main challenge to the engineers was to come up with a new method that would give the company a jump on the competitors.

The answer was worked out with press experts at Emhart Mfg. Co.'s Hudson Div., Hudson, N. Y. First, to make the forming as easy as possible, the engineers decided to process the tubes as flat pieces. After forming, the flat parts are rolled into lock-seamed tubes.

The problem of perforating a specified number of times, then skipping, then hitting again was solved with V & O presses that have skip punching devices and auxiliary counters for controlling cutoff.

Coil stock has extended the mechanization of the operation to include automatic feeding of the strip into the press and automatic cutoff after perforating.

• **Count Off**—The required combination of perforations and spaces is programed on a counter mounted on the back of the press. When set for a specific pattern, the counter actuates a double-acting cylinder on the press slide. The cylinder moves a cam that raises or lowers the slide to perform the programed sequence of hits and skips.

When the perforation pattern is complete, the strip moves to a cutter where the completed tube blank is cut off and dropped into a tote bin. The presses operate at 150 strokes a minute. Total output is 4000 pieces for each 8 hour shift.

Tips on Buying, Use of Numerical Control

Engineers who have worked with the machining technique explain factors that concern prospective buyers, and they tell approximately how much a system can cost

BUCKING the trend away from quiz shows, engineers at Ex-Cell-O Corp., Detroit, formed a panel to answer the 20 questions they are most often asked about their numerical control systems.

Their answers are calculated to help a prospective user evaluate his need for, and ability to use, tape or card programs.

One of the first questions is: How can I determine whether numerical control is suitable for our type of operation?

The answer: Consideration should begin with parts that are expensive to make because of close tolerances and human error; cams are a good example. The second area would be in the manufacture of prototype parts and small lot production. The third would be the manufacture of obsolete parts that require the storage and handling of costly obsolete tooling and machines.

• **Question:** What is the difference in cost of the two basic systems?

For obvious reasons the point-to-point system is less complicated and less expensive than the continuous path system. A simple point-to-point positioning system might cost $5000 to $7000. A continuous path system might run $75,000 to $90,000.

• **Question:** How long does it take to prepare the control information or program a part?

A program can be prepared for point-to-point machining of a part in about 1 hour. A continuous path system involving a complex shape may take as long as three or four days.

• **Question:** What about service life of electronic systems?

Based on the reliability factor in the electronics industry today, the service life of these control systems is excellent. For example, in one year of continuous operation, numerically controlled machines have had less than 0.5 per cent unscheduled downtime and less than 3 per cent maintenance downtime.

• **Question:** Are there any applications for which you do not recommend the use of numerically controlled machines?

Yes. In many high production operations, cam controlled and tracer controlled machines are more economical.

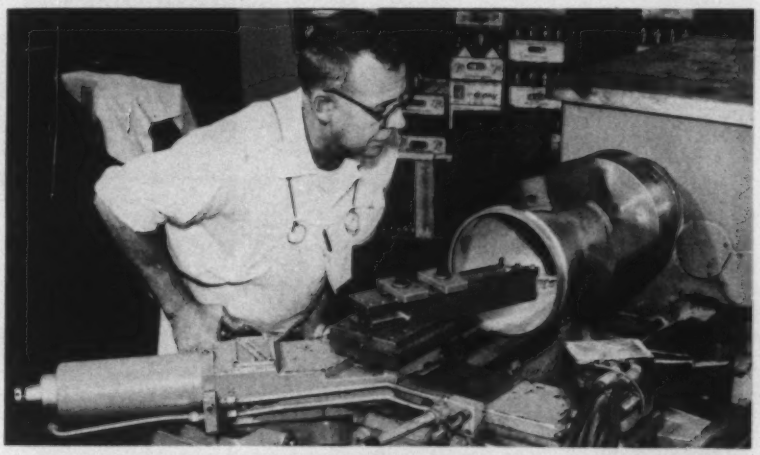
The questions and answers are included in a booklet, "Guide Book of Numerically Controlled Machine Tools." Its aim is to paint a "true picture of numerical control in the light of its application." In so doing, the engineers have explained some common misunderstandings and misconceptions.

Sign of the Times

You'll be seeing this emblem a lot this year. It will be in magazine ads, on some letterheads, and on lapels or ties of most machine tool salesmen and engineers.

The letters represent the slogan for The Machine Tool Exposition—1960, but unless you can get one of your machine tool contacts to explain what the symbol means (or unless your wild guess is right), you'll have to wait a month or so to find out what's behind MMT = PE. It's being billed as the "Formula for Tomorrow."

The campaign, carried on by members of the National Machine Tool Builders' Association, is a deliberate teaser, calculated to drum up interest in (and attendance at) the big exposition slated for Chicago, Sept. 6-16.



CONTOUR MACHINING of forged, pure molybdenum rocket nozzle liners is handled on a production basis at Custom Tool & Mfg. Co., Minneapolis. On a heavy-duty, 16 in. LeBlond tracer lathe, the nozzle liners are contour turned and bored with carbide tools under template control. Wall thickness of the flare must be held to ±.001 in. with a maximum total tolerance of ±.005 required on two difficult tooling passes through the center of the throat configuration

NEW STEEL PRODUCTION RECORDS WITH KAISER BASIC REFRACTORIES!

KEY TO SIDEWALLS: ". . . Periclase Chrome metal cased keys in upper sidewalls of electric furnace gave best performance we've had—15 per cent better than any brick used in the past."

BREAKS PRODUCTION RECORD: "... last furnace rammed with Permanente 165 broke its old production record by more than enough to pay for the bottom."

GUNNING FOR PROFIT: ". . . consumption of K/R 165 Gunning Grains is down to 4.5 pounds per ton compared to 6 pounds for competitive mix—makes it a paying proposition."

EACH of these statements from Kaiser Refractories customers reports a new performance record or production record made possible by changing to a Kaiser Refractories Product.

WHY THIS UNIFORM SUPERIORITY? Kaiser Refractories are especially designed for peak performance in specific applications in open hearth and electric steel furnaces. Each is a specially-developed composition, and all are backed by more than 17 years of continuous research and development.

The uniform composition of Kaiser Refractories—your guarantee of dependability—is assured by Kaiser Refractories' fully-integrated facilities. Quality is rigidly controlled from raw material production to assistance in final installation at your mill.

Ask to see the 30-minute color movie, "Progress in Modern Basic Refractories." Arrangements will be made by your Kaiser Refractories Sales Representative.

KAISER REFRACTORIES*

Mexico Refractories Company now merged with Kaiser Refractories

Call or write Kaiser Refractories & Chemicals Division, Dept. S0213, Kaiser Aluminum & Chemical Sales, Inc., at any of the Division Offices listed below:

PITTSBURGH 22, PA. . . . . 3 Gateway Center
MEXICO, MISSOURI . . . . . Mex-R-Co Building
OAKLAND 12, CALIF. . . . . 300 Lakeside Drive

MEX-R-CO High Alumina, Fireclay and Silica Refractories

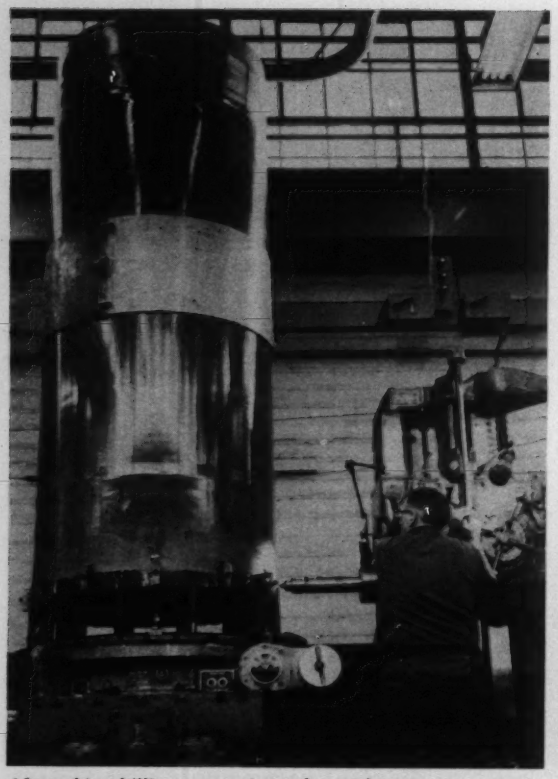
Kaiser Periclase Brick, Mortars, Grains and Ramming Mixes

*TRADEMARK KAISER ALUMINUM & CHEMICAL CORP.

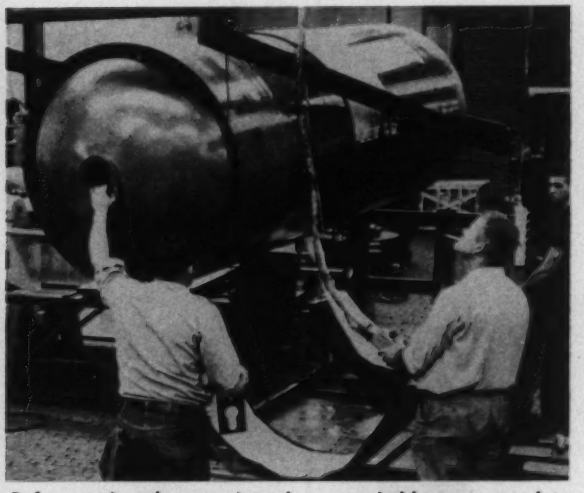
Rocket Motor Cases... Handle with Care

HANDLING solid propellent rocket motor cases during the fabrication process is tedious. Such cases—for birds like Polaris, Pershing, Minuteman, and Sky Bolt—can fail under firing conditions if they have a flaw as small as 0.095 in. in any direction. The problem is notch sensitivity.

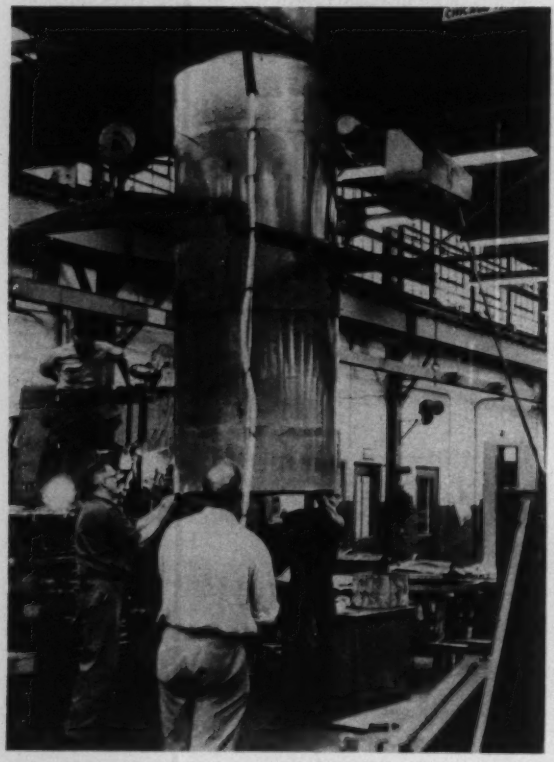
The photographs show how Merz Engineering Inc. (Indianapolis) moves the cases around during certain welding, machining, milling, and finishing operations. The company is a subcontractor for the Rocket Engine Section (Cincinnati) of General Electric Co.



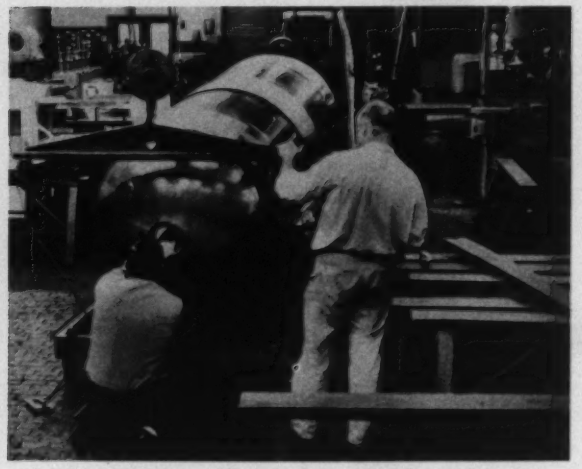
After this drilling operation, the rocket motor case is hauled to thread miller in another machining area



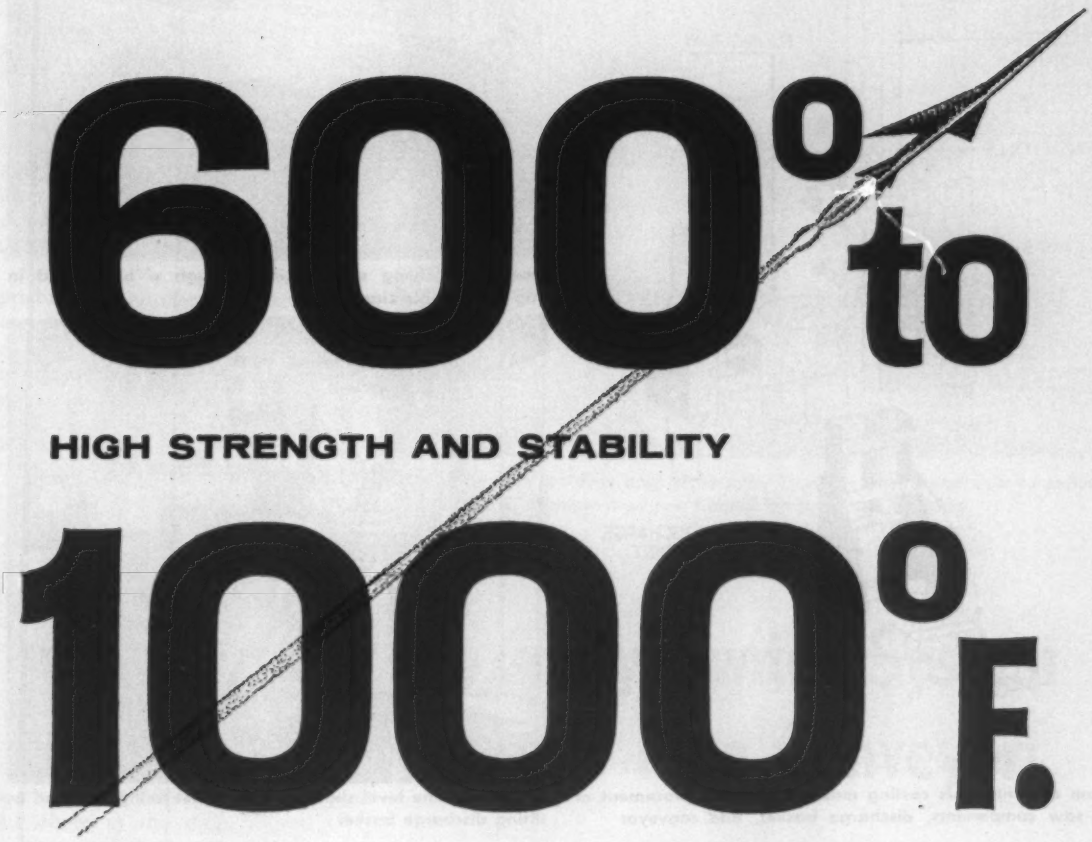
Before setting the case into the cart, air blasts are used to remove the dirt. Corrugated paper is laid down as a cushion



A box frame is hooked to padded bandlike fixture on the case. That prevents swinging as it's moved to a cart



After setting the case into the cart, the box frame is unhooked and the cart is ready to be moved



600° to 1000° F.

HIGH STRENGTH AND STABILITY

WITH GOOD FABRICATION PROPERTIES

AM 350 and AM 355 are metals for the space age! The combination of easy fabrication with high strength-to-weight ratio of AM 350 and AM 355 interests missile and supersonic aircraft designers with problems of high strength at elevated temperatures.

This pair of precipitation hardening stainless steels from Allegheny Ludlum research are easy to fabricate in the annealed condition. They can be spun, drawn, formed, machined, brazed and welded using normal stainless procedures.

Both alloys have high strength without embrittlement from room temperature to 1000°F, plus good ductility at elevated temperatures. They have remarkable stability and excellent corrosion resistance.

AM 350 is available in sheet, strip, foil, small bars and wire. AM 355, best suited for heavier sections, is available in forgings, forging billets, plates, bars, wire, sheet and strip.

For further information, see your A-L sales engineer or write for the new technical booklet, "AM 350 and AM 355," **Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.**

ALLEGHENY LUDLUM

EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT

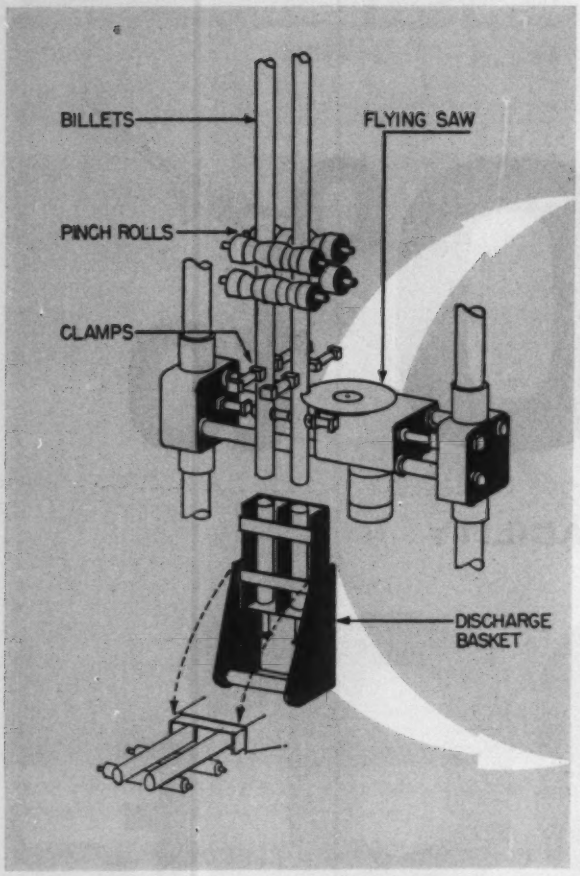
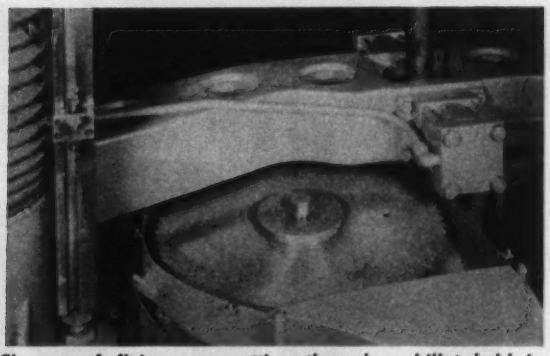
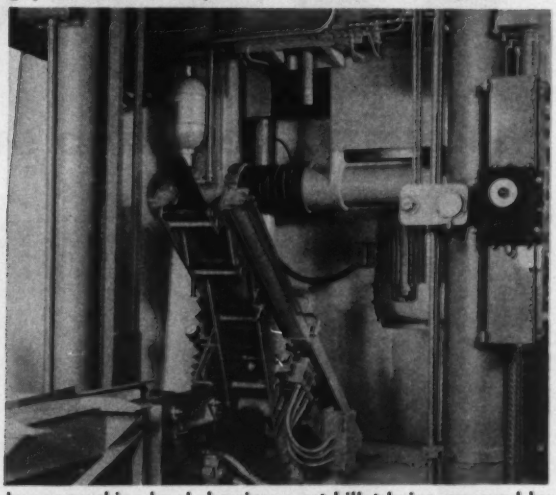


Diagram of continuous casting machine showing placement of flying saw components, discharge basket, and conveyor



Closeup of flying saw cutting through a billet held in grip of a double clamp



Lower machine level showing a cut billet being removed by tilting discharge basket

Flying Saw Attachment Makes Casting Continuous

Maximum mechanization is achieved in the production of copper billets and slabs. Yield and productivity are significantly improved. Entire cycle is automatic

A FLYING SAW mounted on a machine developed by Loma Machine Co. Inc., New York, transforms it from semicontinuous to continuous operation in casting copper billets and slabs.

• **Casting methods are similar for both techniques** (STEEL, Dec. 18, 1958, p. 146). **The similarity ends after the solidified metal leaves the withdrawing rolls.**

Immediately below the rolls is a flying circular cutoff saw that can travel vertically and horizontally. The descending castings are held during cutoff by hydraulically operated clamps on both sides of the blade.

The saw has a 36 in. diameter, high speed steel, segmental blade driven by a 40 hp motor at 1200 fpm. The cutting feed is adjusted up to 2 in. per second. The return rate is 4 in. per second.

The entire cycle of clamping, carriage descent, saw advance, saw return, and carriage return is performed automatically and is synchronized to pace production.

A discharge basket automatically tilts through 90 degrees to eject the cut billets or slabs onto a roller conveyor.

• **Capacity** — Production capacity ranges from 3 tons per hour for double strand casting of 3 in. diameter billets to 10 tons per hour for single strand casting of 5½ in. x 33 in. slabs. Shapes produced include round piercing and extrusion billets, square wire bars, and rectangular slabs. Casting speeds can be varied up to 60 in. per minute.

Gage Speeds Processing Of Defense Projects

An ultrasonic thickness gage has slashed measuring time from days to a few hours in checking missile components.

Built by Branson Instruments Inc., Stamford, Conn., the Vidigage is used to gage reinforced plastic nose cones and radomes (jet and submarine) at Brunswick-Balke-Collender Co., Marion, Va.

Principle: Mechanical vibrations, produced by an electronic oscillator, are transmitted into the material setting up a harmonic resonance which appears as one or more traces on a cathode ray tube. The thickness is read directly from the calibrated scale on the tube.

The parts can be measured while still on a mandrel or mold. No separate checking fixtures are needed for each different component. That eliminates the time formerly spent for frequent checking on the fixture and resetting for shaping.

Alterations can be made on the spot, and the part immediately rechecked for accuracy. One gage can handle any size or shape. Mounted on a wheeled dolly, the instrument is fully portable for use anywhere in the shop.

Because of the instrument's speed, a two man team measures the 4000 plus check points of a B-58 nose radome in less than a day.

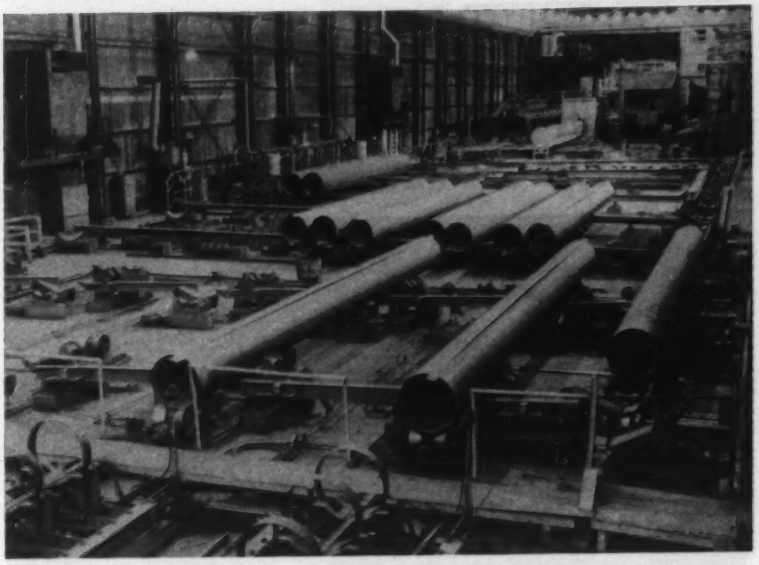
Accuracy to the gage is guaranteed to within 1.0 per cent of actual thickness over a wide scale range, and measurements to within 0.001 in. are possible. The gage can measure thickness of metals and

Rare Earths Uses Mount

Commercial uses for rare earths should expand this year as a result of basic research during the last several years, predicts Sam Norris, president of Nuclear Corp. of America, New York.

Rare earths, particularly yttrium, gadolinium, and erbium, are showing promise of early acceptance by U. S. industry, comments Mr. Norris.

Potential customers: Electronic, aviation, glass, instrument, nuclear, and general metallurgical process industries.



Pipe enters the welding area on a roller conveyor (right) and rolls to stations on inclined rails. Manipulators are tripped by proximity switches

Proximity Switch System Controls Pipe Conveyors

STEEL PIPE for the oil industry is positioned at welding stations by an automatic control system at Consolidated Western Steel Co., Provo, Utah. The programing setup, called Cypak, was supplied by Westinghouse Electric Corp., Pittsburgh.

• The system sequences pipe manipulating devices.

The first pipe to enter a storage area stops at the first of five, semi-automatic welder stations. If the pipe is needed at one of the other stations, the operator presses a call button, and the pipe advances to his position.

Pipe can be held on the conveyors or at waiting stations. Placing a waiting station ahead of each conveyor station doubles the storage capacity of the area.

• Proximity switches monitor pipe positions and actuate manipulators.

Switches detect the presence of pipe by a change of reluctance in a magnetic field. Detectors are protected from mechanical damage; clearances between the pipe and the detector heads can be adjusted. When pipe is in the right position, a proximity switch stops the conveyor and actuates a manipulator control, causing pipe to be discharged onto inclined rails.

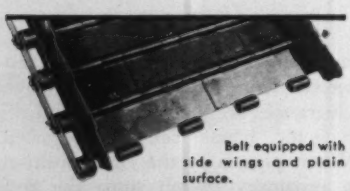
When the internal weld is completed, the operator presses a control button to discharge pipe from his station. Automatic controls take over at that point, automatically collecting pipe from the parallel flow welding stations and loading it on a series flow conveyor. Material then passes through a flux recovery station on its way to the inspection area.

Control cubicles are mounted on a balcony. Each cabinet contains a system tester for maintenance use. Space is provided in each cabinet for additional equipment, to allow for pipe mill sequence changes.

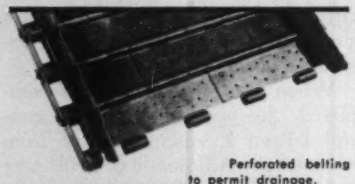
MAY-FRAN HINGED-STEEL BELT CONVEYOR SYSTEM SOLVES ANOTHER PARTS AND SCRAP HANDLING PROBLEM

PHOTO: In this automotive plant, two May-Fran hinged-steel conveyors are utilized to speed production and clear scrap from the working area. Scrap is taken from under floor area and carried to chute where it crosses belt carrying semi-finished parts. Combination chute and storage unit discharges load only when tote box is in position.

8714-MF



Belt equipped with side wings and plain surface.



Perforated belting to permit drainage.

Cleated belting prevents fall-back.

Pre-engineered for maintenance-free operation, maximum economy and long service life, the May-Fran hinged-steel belting has been developed especially for handling all types of heavy and rough materials. This belting is available in any width or length to meet individual job requirements. CUSTOMIZED conveyors can be supplied from stocked component parts. Installations can be made below floor level, flush with floor or above floor level.

Write today for Catalog MF-100

MAY-FRAN ENGINEERING, INC.
1725 Clarkstone Rd. • Cleveland 12, Ohio

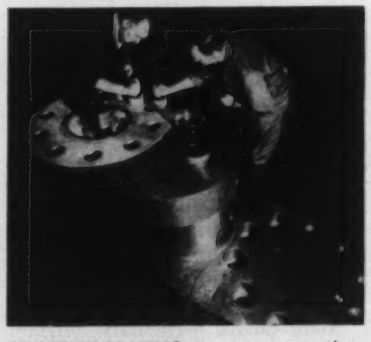
Machinability Improved By Modifying Steel Type

A revised steel specification ended production and machining difficulties in drilling high speed rifle bores at Marlin Firearms Co., New Haven, Conn. Switching to a slightly modified C-1137 steel eliminated such things as excessive drill bit wear, discolored barrels, and other irregularities.

• **Case History**—Drill bits required sharpening twice as often as expected. Each time a batch of barrel blanks started giving trouble, the operator's routine of handling four drilling machines bogged down.

Problems with the steel weren't confined to the drillingroom. Normal bore discolorations and rings produced in drilling usually disappear after reaming. The barrels that gave the drillingroom trouble often were too deeply discolored, or had deep rings that make it difficult to get a good inside finish by reaming.

After making sure that the machine tools were doing an efficient job, Marlin decided to check steel types. Its supplier (Jones & Laughlin Steel Corp., Pittsburgh) made a study and recommended a modified C-1137 steel in which the manganese, carbon, and sulfur are adjusted to develop optimum machinability. The material is supplied as magnetic tested, stress relieved, cold finished bars.



SELECTIVE PLATING serves as a gasket and prevents fretting corrosion on this diesel crankshaft at Todd Ship Yard, Brooklyn, N. Y. The anode pad is saturated with a rapid plating solution of tin and is rubbed over the areas to deposit a 0.001 in. coat. The plating process is marketed by Sifco Metachemical Inc., Cleveland

Power Source for Studwelder Handles 5/8 in. Studs

THE SURGE ARC POWER source for Nelson studwelding equipment provides direct current for welding studs through 5/8 in. in diameter to steel or aluminum. The unit reaches maximum output in less than one cycle.

The only rotating part is a motor driven fan. The three phase, full wave rectifier has twelve 5/8 in. silicone diodes. Their total current carrying capacity exceeds the welder rating. Protective devices prevent diode damage if the unit is overloaded by short circuiting or excessive weld times.

Power supply requirements are three phase, 60 cycle, 230, or 460 volts ac.

An eight position dial matches the output level to the job. Units can be paralleled. With adequate incoming power and suitable cables, two paralleled units will weld Nelson granular flux filled studs 1 in. in diameter.

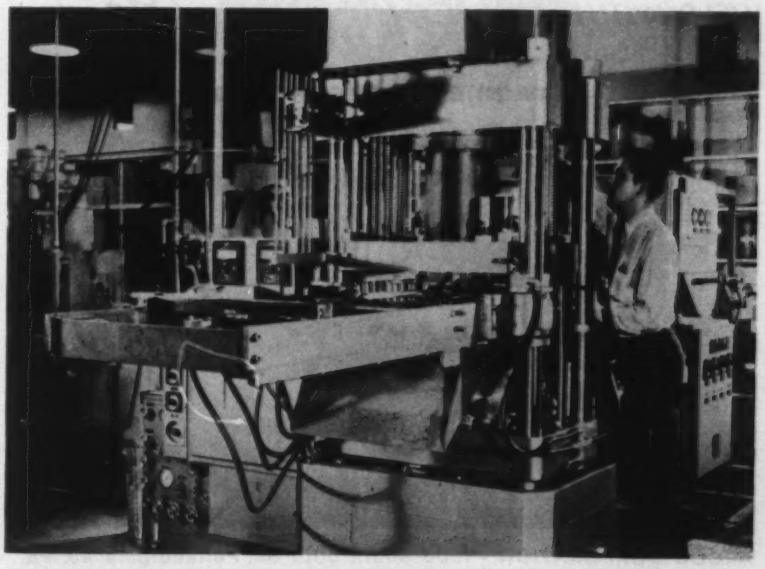
For further information, *write* Nelson Stud Welding Div., Gregory Industries Inc., 2727 E. 28th St., Lorain, Ohio, or Arc Welding Dept., Westinghouse Electric Corp., Ellicott Square Bldg., Buffalo, N. Y.

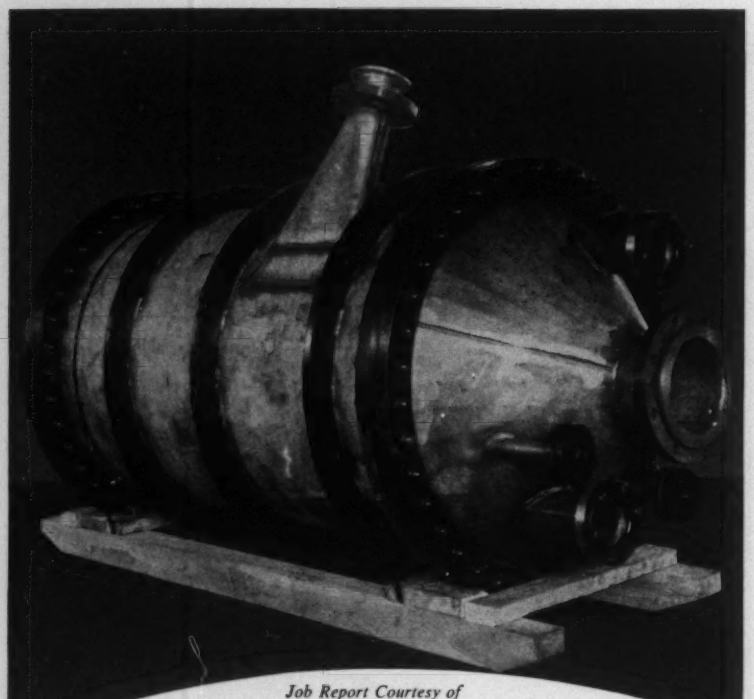
Automatic Molding Presses Rated Up to 300 Tons

THE ENTIRE molding press cycle, from loading preforms in a hopper to discharge of finished molded parts, can be made automatic on a new series of Stokes presses. If you prefer, the cycle can be set to run intermittently, semiautomatically, or manually. Capacities available: 50, 75, 150, and 300 tons.

Pressures in the clamping and transfer ram are independently controlled. Special valving arrangements permit precise adjustments up to full press capacity.

The unit automatically detects short shots or overcharging, and immediately interrupts the press cycle. That is done by measuring "cull" thickness. Another safety feature is automatic detection of an incompletely closed mold to prevent "flashing." The transfer ram can-





Job Report Courtesy of
Leader Iron Works, Inc., Decatur, Ill.

For peace of mind
on any stainless welding job

This vacuum separator, made of 5/16" Type 316 stainless steel, is designed for 100 psi test pressure. To assure *predictable* results, Arcos Chromend KMo Electrodes (Type 316) were selected for a *combination* of top physical, metallurgical and chemical properties. For maximum benefits in welding stainless—consistent quality, low cost weld metal, and reliability in service —you can count on ARCOS.

WELD WITH ARCOS

STAINLESS ELECTRODES

for quality weld metal

ELECTRODES • WIRE • FLUXES
SEMI-AUTOMATIC AND AUTOMATIC EQUIPMENT FOR WELDING
STAINLESS • LOW ALLOY • ALUMINUM • MILD STEEL

ARCOS CORPORATION • 1500 South 50th St., Philadelphia 43, Pa.

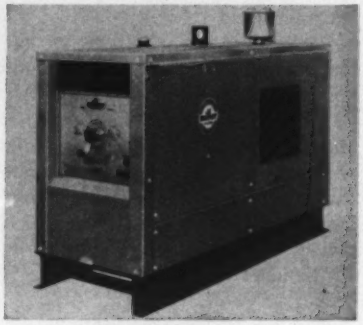
not be actuated until the mold is closed.

For further information, *write* Plastics Molding Equipment Div., F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa.

Diesel Engine Operates Welder, Powerplant

A HERCULES 38 hp diesel drives the DD-250-L dc welder-ac powerplant. The unit has two dc welding ranges (50 to 200 amperes and 150 to 350 amperes).

Rated output is 250 amperes dc at 40 volts, 100 per cent duty cycle. Maximum open circuit voltage is 65.



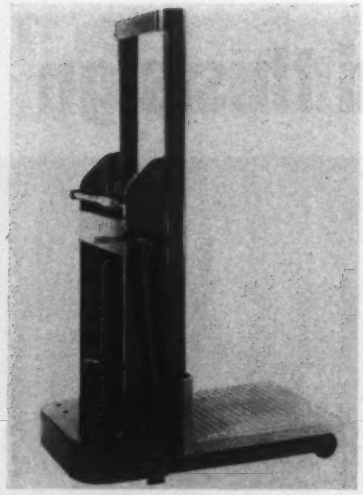
Current adjustment steps are infinite. It's rated at 12 kw, 115-230 volts, single phase, 60 cycle ac with up to 6.5 kw ac while welding. It has 1 kw, 115 volts auxiliary dc power when welding.

For further information, *write* Miller Electric Mfg. Co. Inc., 781 Bounds St., Appleton, Wis.

New Truck Design Improves Operation

BETTER operation has resulted from a redesign of the Safeway portable elevating trucks. They are better looking too. Top corners of the forks that carry the outrigger wheels are rounded to avoid damage and to eliminate jamming against skids or pallets. The steel fork carriage rollers are equipped with permanently lubricated and sealed roller bearings.

Other improvements include close tolerance assembly of carriage rollers



and mast channels (they ride together easily without lubrication), a more accessible lifting cylinder mounting, improved rigidity of the lifting chains crosshead to eliminate rocking from offcenter loading, and testing of all hydraulic pumps on battery powered models.

For further information, *write* American Pulley Co., 4200 Wissahickon Ave., Philadelphia, Pa.

Coolant Can Be Blended With General Purpose Oils

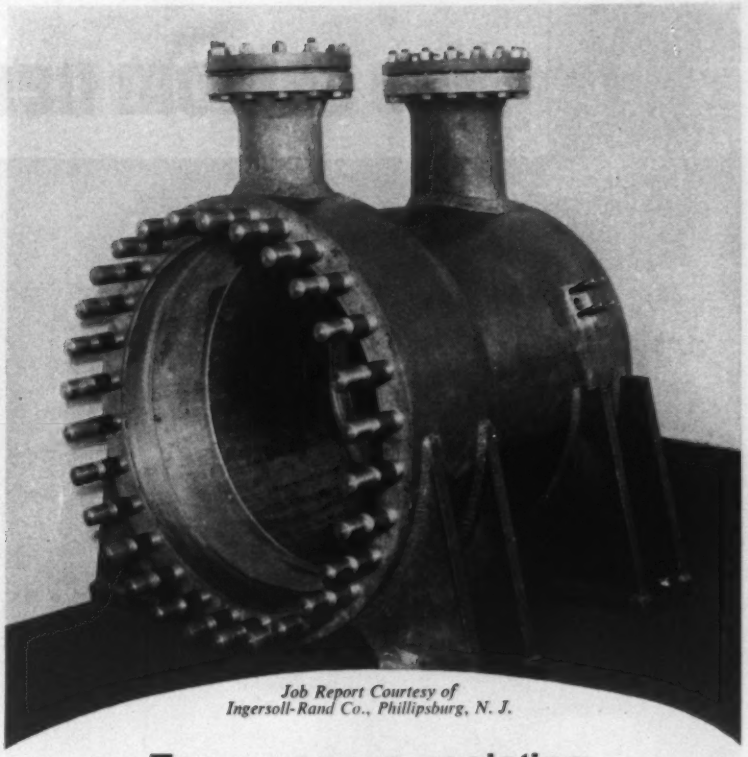
A VERSATILE coolant known as H-101 can be used straight or blended. It has a blend of saponifiables, sulfur and chlorine, is heavy in E. P. value. It can be used as an additive to increase E. P. characteristics of general purpose cutting oils.

Surface finish is good on high alloy materials such as stainless steel, Monel metal and jet engine alloys. Special care is taken to protect operators from skin irritations.

For further information, *write* Shear-Speed Chemical Products Div., Michigan Tool Co., 7125 E. McNichols Rd., Detroit 12, Mich.

Ultrasonic Cleaner Permits Integration of Work

WITH THE AutoSonex ultrasonic cleaner, you can integrate cleaning and degreasing with high speed production of metal parts. Parts enter the unit directly from such



Job Report Courtesy of Ingersoll-Rand Co., Phillipsburg, N. J.

For pressure resisting high strength low alloy welds

The intake and discharge nozzle welds on this re-cycle compressor casing must provide high strength for long service life under rugged conditions. To assure sound, crack-free welds, Arcos Tensilend 70 Electrodes were used. These electrodes, especially suited for welding mild steel and low-alloy high-tensile steels, produce welds with a yield of 70,000 psi in the *as welded* condition. Use Arcos electrodes for the same dependable performance.

WELD WITH ARCOS

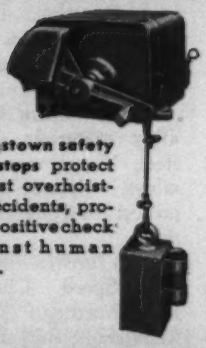
LOW ALLOY ELECTRODES

for quality weld metal

ELECTRODES • WIRE • FLUXES
SEMI-AUTOMATIC AND AUTOMATIC EQUIPMENT FOR WELDING
STAINLESS • LOW ALLOY • ALUMINUM • MILD STEEL

ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pa.

You seldom need this sign



Youngstown safety limit steps protect against overhoisting accidents, provide positive check against human errors.

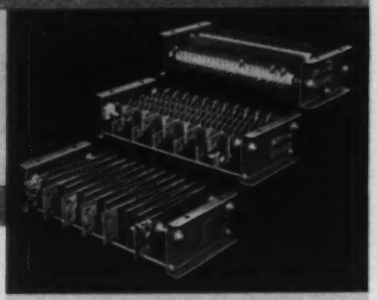
Write for Bulletins on any or all EC&M controls. They give complete descriptions of equipment and explain why EC&M control keeps cranes operating at top efficiency. Square D Company, EC&M Division, 4500 Lee Road, Cleveland 28, Ohio.

SQUARE D COMPANY

EC&M DIVISION • CLEVELAND 28, OHIO

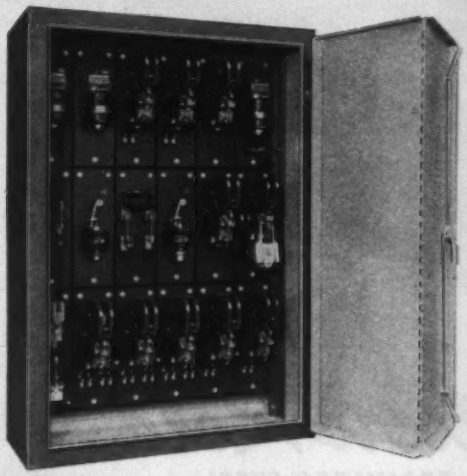
when your cranes are equipped

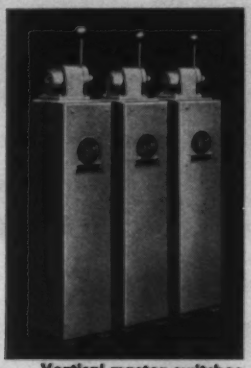
with EC&M CONTROL



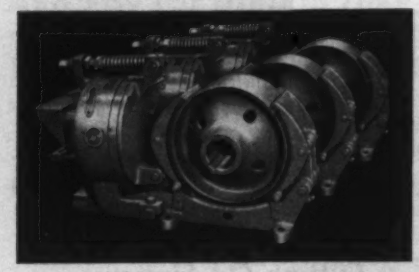
Tab-Weld resistors eliminate burning at the grid eyes or tap plates. Available in capacities from 13 to 500 amperes continuous.

DC controllers are simple to maintain, provide pinpoint accuracy and safe operation.

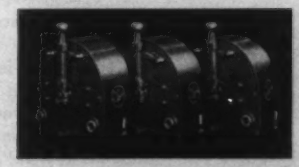




Vertical master switches require little mounting space. Short throw reduces operator fatigue.



Long-life brakes give high-speed performance, have 100% lubrication so that dirt can be flushed out.



CM master switches have short throw of operating handle and narrow width for close grouping.

Manual-magnetic disconnect switches provide a convenient and quick means of "killing" the crane, including an emergency remote-controlled STOP button.

MA master switches provide a maximum of 3 speed points. Can be grouped with other masters or can be used on auxiliary drives.

WHEREVER ELECTRICITY IS DISTRIBUTED AND CONTROLLED . . . . .

3880

equipment as automatic grinders, screw machines, and blanking presses. The company says the machine will keep up with virtually all automatics and deliver clean, dry parts.

The cleaner has a series of four rotating wheels with evenly spaced cubicles to hold the parts. As the parts move automatically through the wheels, they're first immersed in a degreasing solution, powered by ultrasonics, rinsed, drained, and passed through an isolated solvent drying chamber before being discharged.

The company says the machine can eliminate most high temperature cleaning. The cold solvent process (with ultrasonics) removes oils, drawing lubricants, smut, chips, polishing abrasives, and dust, leaving moderate rustproofing, if desired.

For further information, *write* Metalclean Equipment Co., P. O. Box 177, Bala-Cynwyd, Pa.

MicroRold®
STAINLESS STEEL
SHEET & STRIP

FIFTEEN YEARS AGO, we were the first stainless steel sheet producer to recognize the superiority of the Sendzimir Cold Reduction Process over conventional rolling equipment for exceptionally close tolerances.

Our equipment is such that tolerances can be held to as low as 3% (plus or minus), as compared to the A.I.S.I. maximum allowable variation of 10%. This "Thinness Control" means the ability to control decimal thickness with microaccuracy, giving you more stainless area per ton or the equivalent area with less weight. It is this controlled accuracy and uniformity that directly relates to fabricating economies and satisfaction in the ultimate end use.

Distributed by steel warehouses throughout the world!

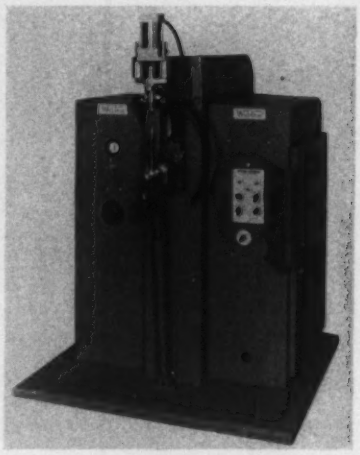
Send for your copy of "MicroRold Stainless Steel Handbook"

WASHINGTON STEEL CORPORATION
WOODLAND AVENUE • WASHINGTON, PENNSYLVANIA

Welder Doesn't Damage Vinyl Coated Steel

WITH THE Weldex "spike" welder, you can make 500 welds a minute and get blemishfree joining of coated metals and ⅛ in. aluminum pieces. The unit produces 100,000 plus ampere pulses of about 1 millisecond duration.

Parts such as studs, clips, and brackets have been welded to vinyl or lacquer coated steel without damage or discoloration. Other applications include welding of chrome and copper plated metals, dissimilar metals, and nonferrous metals. The unit



has minimum electrode temperature buildup and little electrode pickup on aluminum and zinc coated metals. Electrode cleaning downtime is reduced.

For further information, *write* Weldex Div., Metal/Craft Co., 3300 Doris Ave., Detroit, Mich.

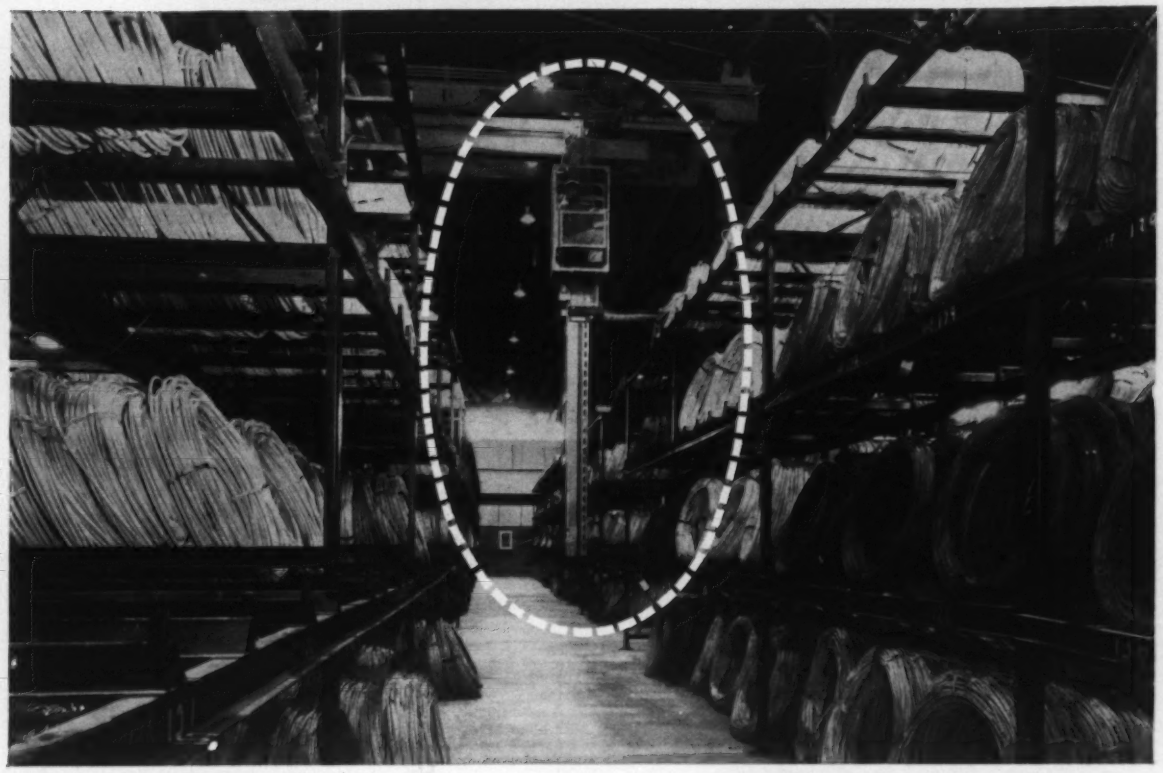
Cutting Oil Improves Tap Life, Surface Finish

A CUTTING OIL called No-Gall can prevent galling of cutting tools and workpieces in operations such as broaching, tapping, and threading.

In tapping cast SAE 4140 steel (Rockwell C 35 hardness) tap life was tripled and surface finish on workpieces was considerably improved, says the company. The compound is applied directly to the cutting tool edges by brushing.

For further information, *write* Hal Industries, Box 224, Wyckoff, N. J.

How a TRAK-RAK Crane Can Save You Money
BEFORE IT'S INSTALLED....



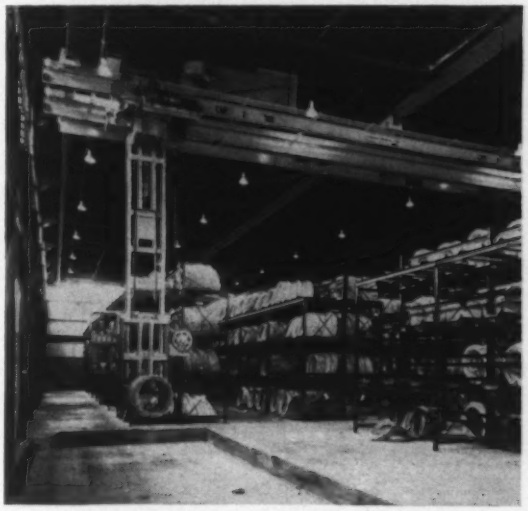
And Pay For Itself in Time and Labor Savings After It Goes to Work!

Considering an addition to your present storage facilities—or planning construction of a new warehouse building? A TRAK-RAK Crane can save you money by permitting a sharp reduction in the overall size of the addition or building... and still enable you to store the same volume or tonnage.

Hundreds of installations in warehouses and plants of every type are proof of the speed, efficiency, and economy of the TRAK-RAK System. A recent installation at Chandler Products Corporation, Cleveland, is a case in point.

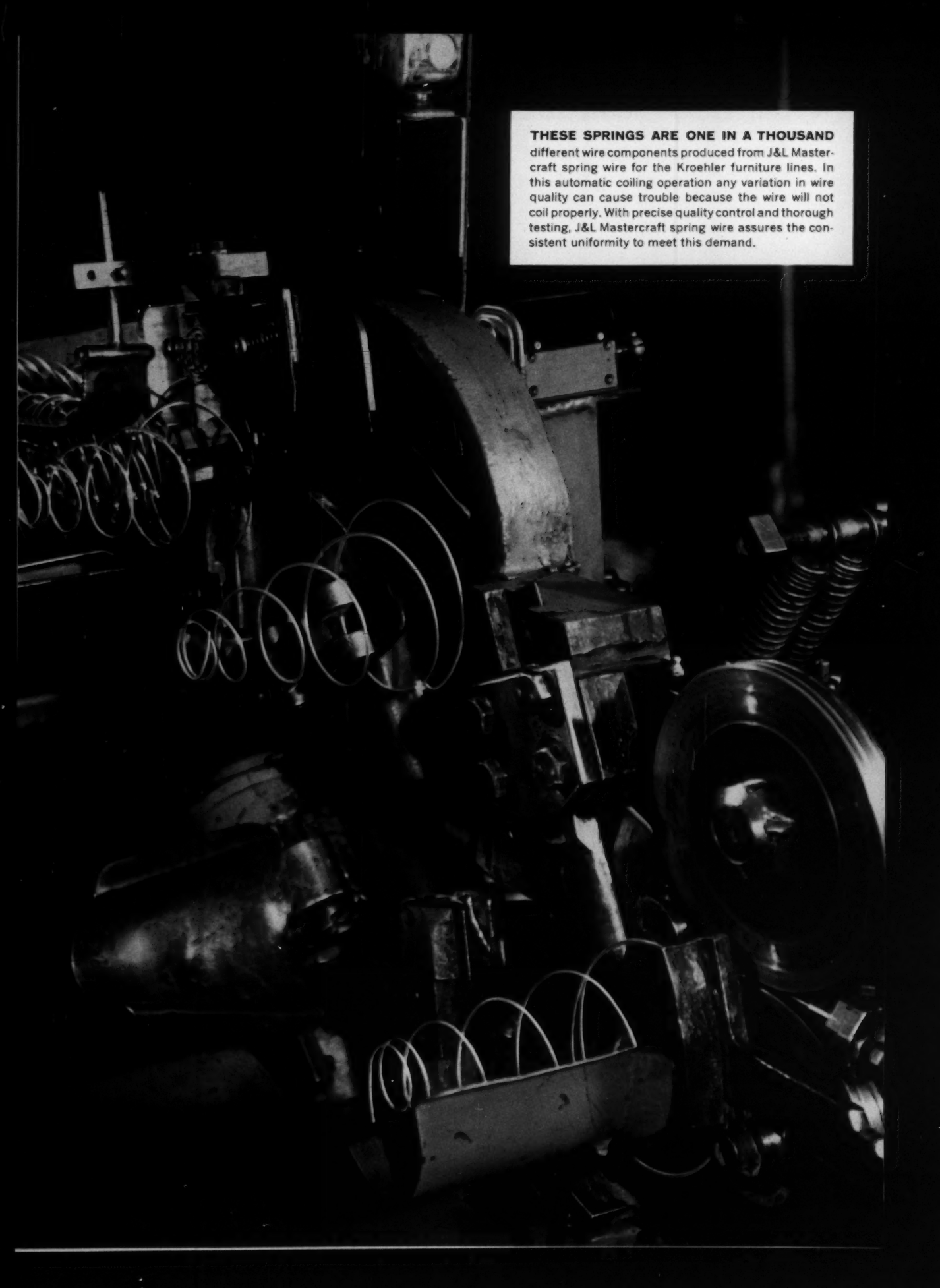
> In an area of 20,000 sq. ft., 7500 coils (2,500,000 lbs.) are stored four high—using the floor and 3-tiered racks. The TRAK-RAK Crane handles the entire stock, from unloading coils at the rate of 1000 lbs. per minute from trucks, to moving them in and out of storage. Manpower savings of 70% . . . increased handling speed and safety . . . optimum rotation of stock . . . and a considerable reduction in warehousing costs are reported by the Company.

A TRAK-RAK Crane can be installed in your present warehouse area, enabling you to increase storage capacity, speed handling, and reduce costs. *Why not write for details now?*



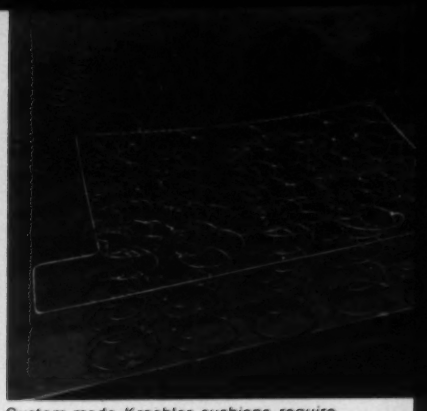
TRAK-RAK Crane at truck unloading area. Unit unloads 1000 lbs. of coil stock per minute.

CTC CHICAGO TRAMRAIL CORPORATION | 1326 SOUTH KOSTNER AVENUE CHICAGO 23, ILLINOIS

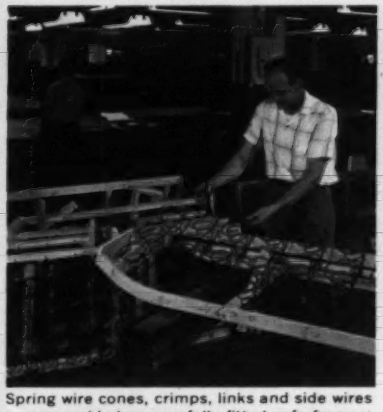


THESE SPRINGS ARE ONE IN A THOUSAND different wire components produced from J&L Mastercraft spring wire for the Kroehler furniture lines. In this automatic coiling operation any variation in wire quality can cause trouble because the wire will not coil properly. With precise quality control and thorough testing, J&L Mastercraft spring wire assures the consistent uniformity to meet this demand.

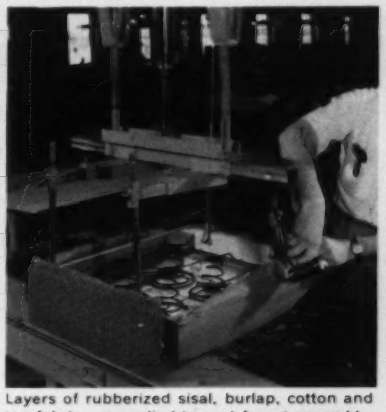
Bottom cross crimps for Kroehler davenports require a spring wire that will withstand severe punishment in crimping. At this Naperville plant, capacity is over 100 units of furniture an hour.



Custom-made Kroehler cushions require many components made from J&L wire.



Spring wire cones, crimps, links and side wires are assembled on carefully fitted sofa frames.



Layers of rubberized sisal, burlap, cotton and top fabric are applied to seat frame assembly.

A skilled operator applies finishing touches to this Kroehler chair.

Over 400 separate items of furniture are produced for the Kroehler and Valentine Seaver lines by 17 plants in the U.S. and Canada. Helping to uphold the Kroehler reputation for fine furniture are the many spring wire components produced from J&L Mastercraft wire.

Report from the world's largest furniture maker...

"We reduce rejects, machine downtime and waste with J&L Mastercraft spring wire"

. . . Kroehler Manufacturing Company

"We've never had to remove a J&L Mastercraft coil from a machine . . . never had to call in J&L to solve a wire deficiency problem.

"Our machine operators are sold on J&L wire. The uniform physical properties of Mastercraft spring wire result in more uniform production runs, with fewer machine adjustments. Also, J&L's special spring wire finish does not foul our machines. That means fewer shutdowns for equipment cleanup."

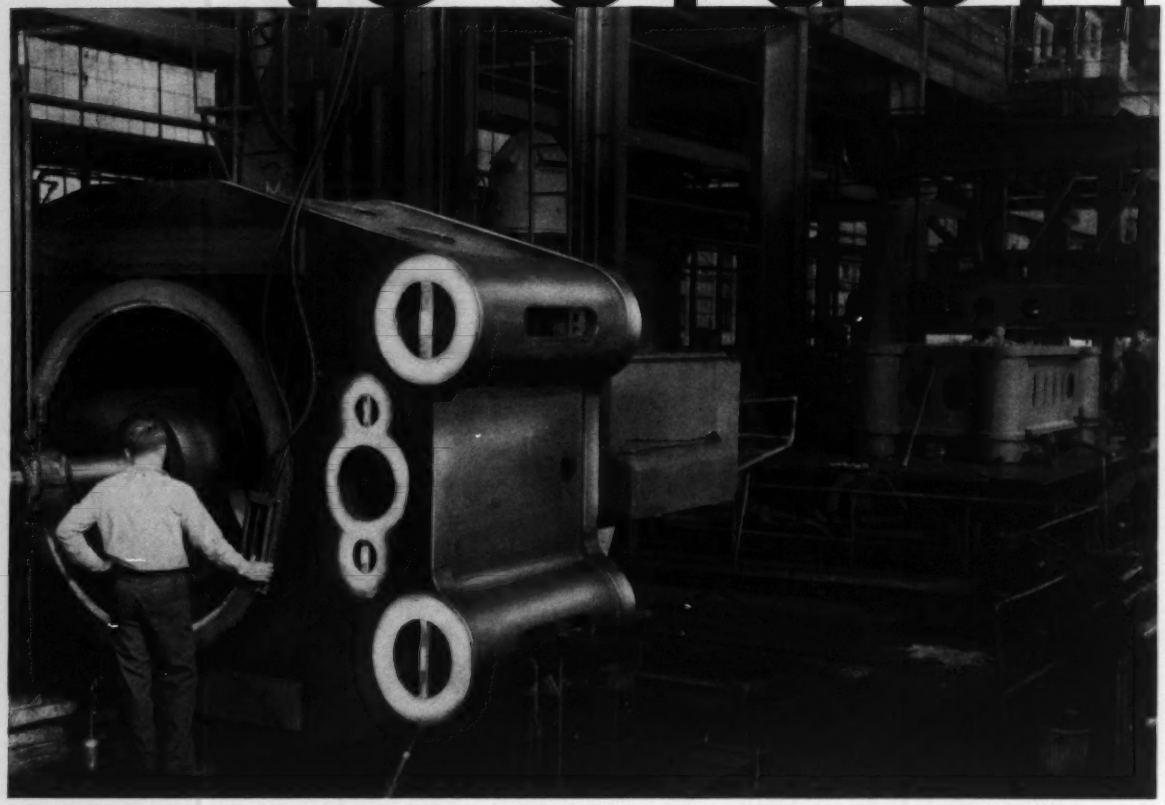
Similar facts are reported by many other automatic spring-making operators. Reduced rejects, increased production are achieved because every coil of Mastercraft, hard-drawn MB or Electromatic oil-tempered MB spring wire is quality controlled, completely tested.

Try this superior J&L product. It's tops in quality, competitive in price. Contact your nearest J&L district office, or write to Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

Jones & Laughlin Steel Corporation

PITTSBURGH, PENNSYLVANIA

Build exactly what you want ... to order!



VERSATILITY—that's the word for Sun Ship. And that's why you get the machinery or industrial equipment you need, built exactly to your requirements, when you specify Sun Ship.

Consider, for example, the machining operations shown above. To the left is a press cylinder being machined on a 72″ Draw-shaper and to the right is a large platen on a 14′ wide Planer. Here we custom-produce a wide variety of machinery or machine components to do difficult jobs in petroleum, chemicals, atomic power—in many fields.

If you would like to investigate the advantages of Sun Ship machine building service, why not contact our Sales Engineering Department now? For information and data on any phase of our service, simply write

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SHIPBUILDING & DRY DOCK COMPANY

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NEW literature

Write directly to the company for a copy

Vibrating Feeder Line

A 12 page bulletin, Book 2869, illustrates the single and twin motor types in either floor mounted or cable suspended models of Link-Belt's motorized, counterweight, vibrating feeders. Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

Air Compressor Data

Selection of single stage, centrifugal compressors up to 4.0 lb equivalent air pressure for air applications can be made by means of condensed procedures given in two bulletins, 16B9485 and 16B9486. The bulletins contain standard ratings, dimensions, and list prices. Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Spray Washing, Phosphatizing

Flexible, standardized, conveyorized, stage-by-stage units of power spray washing and phosphatizing equipment are described in Bulletin 659-1. Ramco Equipment Corp., a division of Randall Mfg. Co. Inc., 1379 Lafayette Ave., New York 59, N. Y.

Ball Bearing Manual

A 140 page "Design and Purchasing Manual" on miniature and instrument ball bearings, gives specifications on 370 standard bearings from 1/10 to 5/8 in. OD. Engineering bulletins discuss factors in bearing life and operation. New Hampshire Ball Bearings Inc., Route 202, Peterborough, N. H.

Aluminum Housings

A 16 page catalog presents design information and dimension charts for the Adalet cast aluminum housing for explosionproof and weatherproof applications. Adalet Mfg. Co., 14300 Lorain Ave., Cleveland 11, Ohio.

Speedfax Catalog

A 60 page Speedfax catalog gives selection and application on molded case and low voltage, power circuit breakers. I-T-E Circuit Breaker Co., 1900 Hamilton St., Philadelphia 30, Pa.

Tap Selector

A 28 page reference discusses the correct tap and gage to use for optimum production. Hanson-Whitney Co., Hartford, Conn.

Zirconium Data

A zirconium fact file contains technical data, and information on application, and available forms of this metal. Zirconium Association, 2130 Keith Bldg., Cleveland 15, Ohio.

Engineering Data

A 12 page brochure gives basic engineering data and specifications on various hexagon, pointer, and locknut sizes. National Machine Products Co., Utica, Mich.

Polishing Wheels

A catalog describes a line of inflated polishing wheels and expanding polishing wheels, as well as sanding drums, belt sanders, and expanding cones. Also given are cost analysis sheets for comparing costs of setup wheels against coated abrasive operations. Catalog Dept., Nu-Matic Grinders Inc, 875 E. 140th St., Cleveland 10, Ohio.

Pump Catalog

A 72 page catalog gives design details and operating characteristics on a line of hydraulic pumps, fluid motors, and valves. Denison Engineering Div., American Brake Shoe Co., 1160 Dublin Rd., Columbus, Ohio.

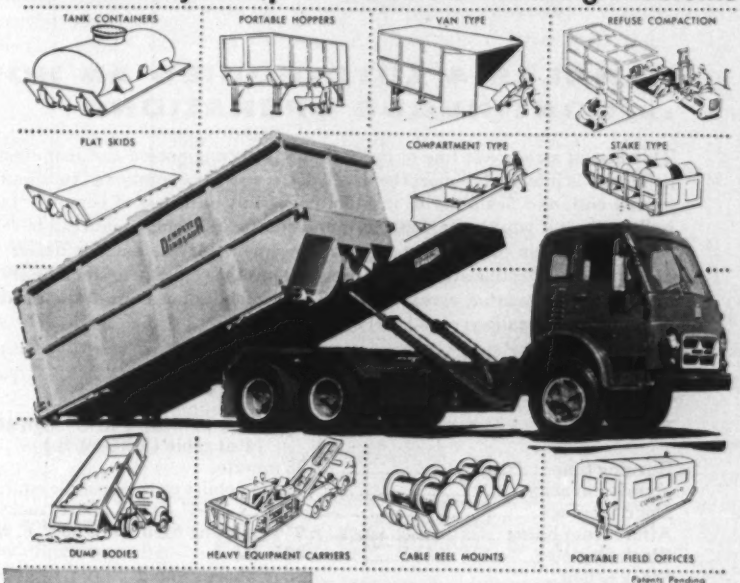
Holmium Metal

Many properties of this rare earth metal (including melting and boiling points, crystal structure, atomic radius, and magnetic moment) are included in a data sheet. Research Chemicals Div., Nuclear Corp. of America, 170 W. Providence St., Burbank, Calif.

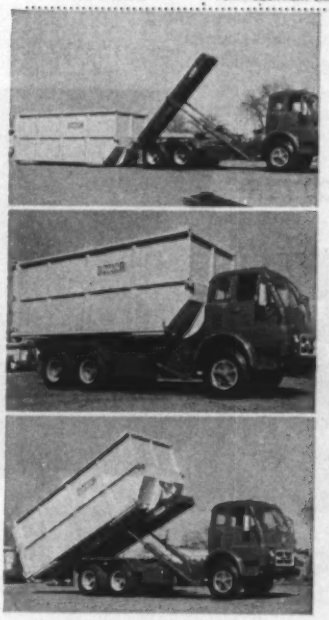
Induction Heating

An 8 page booklet illustrates different types of induction heating equipment and applications. Data include: Selection chart for billet heaters, melting rates in pounds per hour, table of frequencies, and individual production specifications. Ajax Magnethermic Corp., P. O. Box 839, 3990 Simon Rd., Youngstown 1, Ohio.

One DINOSAUR With Detachable Containers . . . . Solves Many Complex Materials Handling Problems



Patents Pending



Here's the materials handling tool that takes up where the fork-lift truck leaves off. Gigantic loads can be placed on skids, in tanks or containers. The DEMPSTER-DINOSAUR picks them up . . . automatically . . . in seconds . . . and whisks them to their destination, in-plant or to over-the-road locations. Here they are put down, intact . . . pushed off on a dock . . . left on telescopic legs . . . or dumped.

One truck handles any number of containers of many types. Value of truck is multiplied . . . standing-idle time is eliminated . . . loading and handling is cut to the minimum. One man, the driver, handles the all-hydraulic operations without leaving the cab.

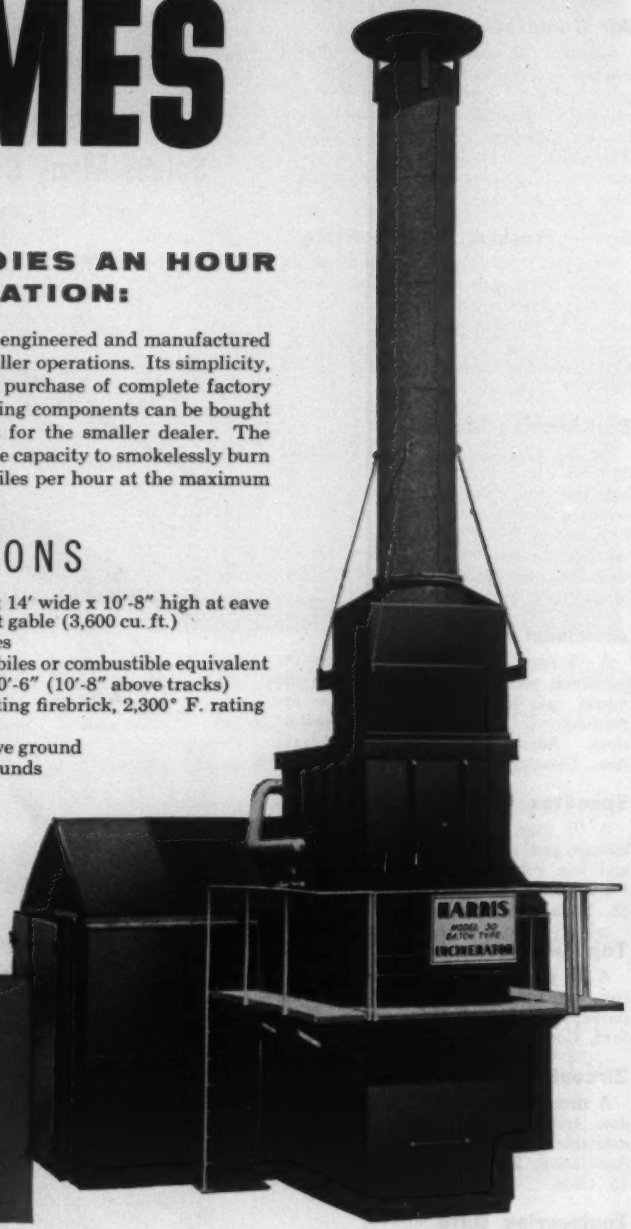
Containers available up to 40 cu. yds. and over . . . loads are limited only by the capacity of the truck. If you have a special problem send it in.

Write For Free Brochure

DEMPSTER BROTHERS
Inc.
KNOXVILLE 17, TENN., DEPT. 5-2

Harris Model 30 Batch Incinerator

CONTROLS SMOKE AND FUMES



HANDLES 4 AUTO-BODIES AN HOUR ...CONTINUOUS OPERATION:

This first of a complete line of incinerators being engineered and manufactured by Harris is intended to meet the needs of the smaller operations. Its simplicity, overall cost, and flexibility of installation permit purchase of complete factory built unit, or if you prefer, the major and controlling components can be bought separately. This provides an ideal arrangement for the smaller dealer. The exceptionally effective afterburner provided has the capacity to smokelessly burn all combustible matter, except tires, in 4 automobiles per hour at the maximum firing rate of 40 gallons of #2 fuel oil per hour.

SPECIFICATIONS

Kiln size	20′ long x 14′ wide x 10′-8″ high at eave 14′ at gable (3,600 cu. ft.)
Burning time	25 minutes
Hourly capacity	4 automobiles or combustible equivalent
Door openings	11′-0″ x 10′-6″ (10′-8″ above tracks)
Afterburner lining	9″ insulating firebrick, 2,300° F. rating
Stack diameter	36 inches
Stack height	35 ft. above ground
Estimated weight	55,000 pounds

Talk with a Man from Harris

HARRIS FOUNDRY & MACHINE CO.

Since 1889

CORDELE, GEORGIA

Mills See No Cause for Alarm

SCARE talk notwithstanding, the outlook for steel and its major consumers remains exceptionally bright.

Market analysts aren't quite as exuberant about 1960 prospects as they were, but they're still looking for a banner year. Their chief concern: The possibility that customers may talk themselves into a recession.

As steelmakers see it, there's too much pessimism about new car sales too early in the year. There's too much viewing with alarm the news that mills are catching up with their backlogs and won't run at full tilt forever.

NOT TOO AGONIZING—Reappraising the market, industry specialists will make one concession to the pessimists: This year's ingot production probably won't reach the previously forecast 130 million tons. Maximum output is expected to be somewhere between 120 million and 125 million—still surpassing the previous high (117 million in 1955) by a wide margin. A drop of less than 5 per cent shouldn't frighten anybody. It certainly doesn't spell recession.

NEW LOOK AT INVENTORIES—Commercial research men based their 130 million ingot ton forecast (roughly equivalent to 97.5 million tons of finished steel products) on the assumption that users would chew up about 85.5 million tons and increase their inventories by 12 million. They've lowered their sights because:

- Inventories apparently weren't as depleted at the start of the year as originally believed. December mill shipments of 8.1 million tons were surprisingly high, and imports (539,000 tons) far exceeded expectations. On Jan. 1, users probably had 10 million to 11 million tons of steel, instead of 9 million.
- Stockpiles are being rebuilt more rapidly than expected.
- Users don't want to carry as much steel as they've had in other years. There's no danger of strikes or shortages, so they'll push the stockpiling function back on the mills.
- Steel consumption in some lines, especially autos and appliances, may be somewhat less than anticipated.

In summary, analysts expect ingot production to be about 124 million tons instead of 130 million—not so much because there will be less consumption than originally expected but because less steel will go into inventory. Assuming shipments of 93 million tons, users will probably consume about 84 million and add 9 million to their stockpiles.

GALVANIZERS GET NO REST—With automakers expected to trim their purchases in April, most flat rolled products will soon be available on normal leadtimes. Galvanized sheets are an exception. Most producers expect to operate close to capacity all year. Buyers are seeking new sources of supply. A leading producer who is known for staying open when other mills are struck reports that many would-be customers are trying to get on its books for the first time. "We can't do a thing for them," a company spokesman declares. Chicago mills are turning down orders. Eastern producers have more second quarter business than they can handle.

HIGH OUTPUT CONTINUES—Last week, steelmakers operated their furnaces at 94.5 per cent of capacity, up 0.2 point from the previous week's revised rate. Production was about 2,693,000 ingot tons. Paradoxically, STEEL's composite price on No. 1 heavy melting scrap dropped $1.83 to $39.67 a ton—the lowest it has been since last September.

WHERE TO FIND MARKETS & PRICES

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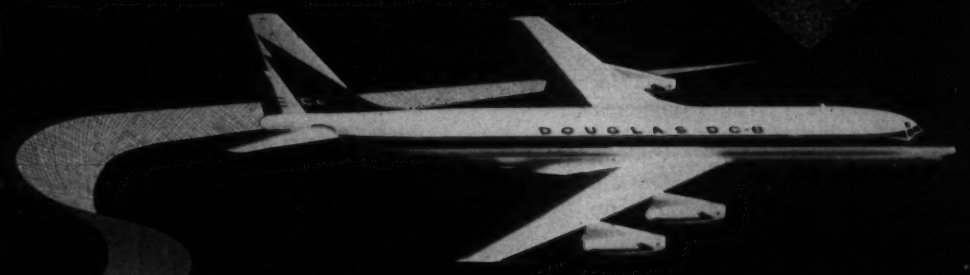
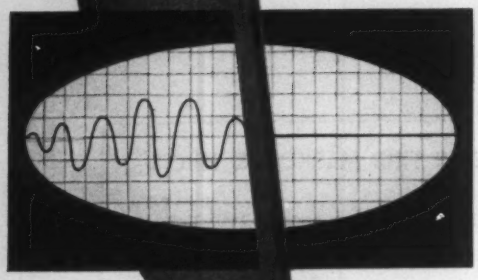
*Current prices were published in the Feb. 15 issue and will appear in subsequent issues.

New Fabric Uses *POWDERED LEAD*



To Hush Jetliner's Roar

Ounce-conscious aircraft designers find LEAD worth its weight in unique sound attenuation properties



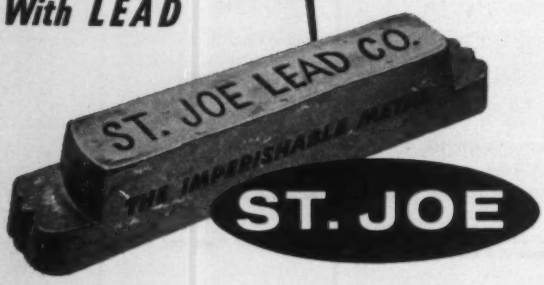
Sound attenuation is the ability or property of absorbing or deadening sound—and lead was the only material that could do the job effectively and inexpensively in this new airborne acoustical fabric.

Called Coustifab*, the new material is made of either cotton or glass fabric coated with Goodrich Geon polyvinyl material compounded with *powdered lead*. It is being used in the ceilings and rear side panels of the new Douglas aircraft to absorb low frequency vibrations which normal acoustical material cannot handle.

This exceptionally flexible way of using lead opens new avenues of application for this versatile metal. By varying the lead content which may run as high as 80% by weight depending upon the specific use, the new fabric may have a wide potential for office machines, X-ray rooms, building materials, industrial plants and other places where the unique silencing or protective properties of lead are required.

**Product of Cordo Chemical Corporation, Norwalk, Conn.*

Look Ahead With LEAD



ST. JOSEPH LEAD COMPANY

250 PARK AVENUE NEW YORK 17, NEW YORK

The Largest Producer Of Lead In The United States

PB-145

Vinyl-Metal Potential: 1 Billion sq ft

PLASTIC COATED sheet metal (steel, aluminum, magnesium) is catching the fancy of consumers in a sensational way. Demand for vinyl laminates alone is 40 times that of five years ago. In 1955, it was 1 million sq ft; last year it was an estimated 40 million.

But wait! It's predicted that demand this year will hit an astounding 115 million to 150 million sq ft. Sellers say that's only a good start in a market with an estimated annual potential of 1 billion sq ft.

"This new industry is developing fast," says Worth E. Munn, vice president, Di-Noc Chemical Co., Cleveland.

Edward L. Mahoney, director of sales, Vinyl Metal Products Div., Columbus Coated Fabrics Corp., Columbus, Ohio, says: "We look for a substantial increase in metal laminate business in 1960."

"The outlook is terrific," is the way W. W. Day, advertising manager, Masland Duraleather Co., Philadelphia, puts it.

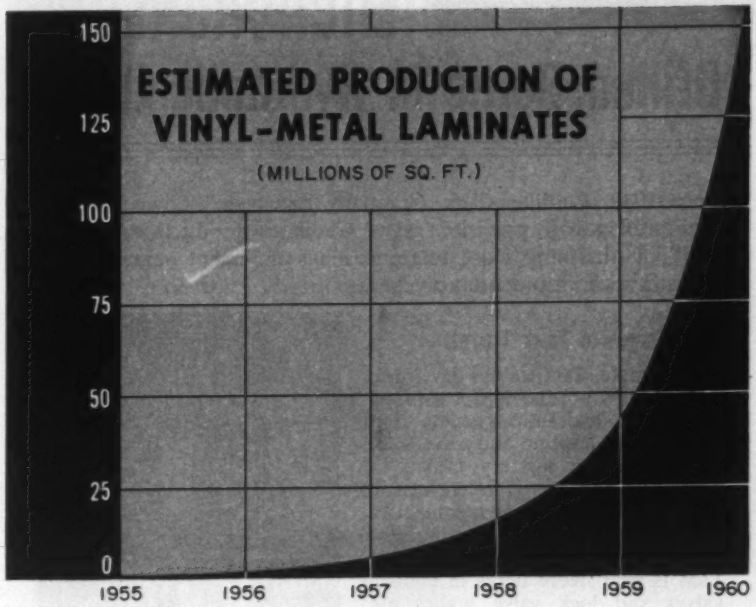
• Edward B. Osborne, market manager, B. F. Goodrich Chemical Co., Cleveland, says the "marriage" of vinyl plastic and metals may revolutionize manufacturing and marketing in many consumer product lines.

Plastic coated steel is being used in many commonplace items, but the market has barely been scratched.

Research and development will open up many more large uses (see list of potential outlets). The original equipment market (embracing appliances, television and radio, vending machines, and like equipment) now provides the chief market outlet for laminates. Manufacturers say the home appliance field, which annually consumes 175 million sq ft of coated metals of all kinds (paint, lacquer, phosphate, plastic), presents a particularly attractive field for plastic metal growth.

• Vinyls are applied to flat metal stock by coating and laminating. The methods include: Organisol roll coating, dipping and spraying, and the lamination of calendered vinyl sheeting to metal.

Calendered, semirigid, polyvinyl chloride film laminated to sheet metal (vinyl-metal laminate) is widely used with many alloys and tempers of steel (galvanized, electrolytically coated, and aluminized), aluminum, and magnesium as bases.



Estimates by vinyl suppliers.

Potential Markets for Vinyl Coated Metal and Vinyl-Metal Laminates

Furniture, Appliances

Air conditioners
Breadboxes
Cabinet doors
Card tables
Clothes hampers
Desk tops
Dishwashers
Folding chairs
Food cannisters
Freezers
Humidifiers
Juvenile furniture
Kitchen cabinets
Lawn furniture
Oil burner housings
Radio, TV cabinets
Refrigerators
School seating
Table tops
Vacuum cleaners
Venetian blinds
Washers and dryers
Wastebaskets
Water coolers

Transportation

Arm rests
Baggage racks
Ceiling panels
Dashboards
Instrument panels
Interior door panels
Kick pads
Seat backs
Side panels
Station wagon flooring
Trailer body panels
Transmission covers
Trim
Window frames

Luggage

Suitcases
Trunks
Miscellaneous

Construction

Awnings
Ceiling panels
Counter tops
Curtain walls
Doors
Ductwork
Elect. cover plates
Gutters, downspouts
Partitions
Roofing
Shower stalls
Sinks
Wainscoting
Wall siding

Vending Machines

Bulk food
Cigaret
Packaged food

Miscellaneous

Advertising displays
Boat decks
Bottle caps
Bulletin boards
Camera shells
Containers
Drums
Gun cases
Highway signs
Ice chests
Packaging
Picnic jugs
Projectors
Tackle boxes
Telephone cases
Toys

Business Machines

Calculators
Cases
Housings
Typewriters

Vinyl plastisol is gaining broad acceptance. It's cured and bonded to sheet or coil stock (cold rolled or galvanized steel) in a continuous mill operation.

Another coating gaining in favor is a polyester film applied to coil stock.

In the process, the steel can

Why Cadillac Gage MICROHONES* Drilled Bores in Hydraulic Units

Since 1940, Cadillac Gage Company has been known for the quality of its high precision gages. Cadillac's production "know-how" in obtaining close tolerances has in recent years led to diversification in precision products.

From Gages to Tank Turrets

For example, Cadillac has developed and are now producing, for a prime contractor, hydraulic systems that control gun elevation and traverse of gun turrets on military tanks. In these units, geometric tolerances in millionths of an inch and a controlled surface finish are mandatory for smooth, dependable performance. That is why sleeve bores in control valves and lock valve bodies are Microhoned.

Simple collet-chuck fixturing permits fast, easy accommodation of various workpiece sizes. A Micromatic-designed tool speeds tool changeover.

Efficient Stock-Removal and High Precision

Because Microhoning is both a stock-removal and a precision finishing process, Cadillac engineers specified only two machining operations for the sleeve bores: drilling and Microhoning. Sleeves (hardened to 63 R "C") are Microhoned to generate roundness and straightness within 20 millionths of an inch tolerance over the full length of the bore. Also, in removing from .008" to .010" of stock, Microhoning consistently produces a surface finish of 4 microinches rms.

MMT-PE

Higher Quality — Lower Scrap

Every Microhoned bore is checked on a precision air gage . . . this 100% inspection insures highest quality control. Mating spools are selectively fitted to the Microhoned sleeve and clearance is held to between .00002" and .0001". Every sleeve and spool assembly must withstand a rigorous 3,000 psi leakage test. Scrap rate is practically nil.

With Micromatic equipment, Cadillac has substantially increased production; they control surface finish within closer limits; consistently generate specified geometric accuracy: and practically eliminate scrap. How Microhoning accomplishes these results is explained on facing page.

**Registered U.S. Pat. Off.*

MICROMATIC HONE CORP.

8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN

be decorated in any pattern that can be photographed.

• Today, you can buy precoated vinyl laminate, vinyl plastisol, and polyester coated sheets and strip in most widths and thicknesses.

Stock comes in a broad range of colors and textures, has high resistance to abrasion, scratches, stains, acids, salts, chemicals, and corrosion. The product is sheared, slit, punched, lock seamed, stamped, or roll formed without damage to the coating, or without affecting color changes. Other advantages: Heat insulating and noise reducing characteristics, noncombustibility, ease of cleaning and maintenance, ease of fabrication.

Plastic coated metal has great market appeal from a styling viewpoint. George W. Walker, vice president and styling director, Ford Motor Co. (licensed by U. S. Rubber Co. to use the laminating technique), says it opens up exciting avenues for the automotive stylist—offering the combination of economy, strength, and beauty.

Manufacturers of Vinyl-Coated Metal and Vinyl Metal Laminates*

(In production or licensed)

American Nickeloid Co., Peru, Ill.
American Steel Band Co., Pittsburgh
Acme Steel Co., Chicago
Arvin Industries Inc., Columbus, Ind.
Clad-Rex Div., Simoniz Co., Chicago
Container Div., Jones & Laughlin Steel Corp., Toledo, Ohio
Elwin G. Smith & Co., Pittsburgh
Enamel Products & Plating Co., McKeesport, Pa.
Enamelstrip Corp. (subsidiary, National Steel Corp.), Allentown, Pa.
Flam-au-Hart (Phoenix Works), Belgium
Ford Motor Co., Dearborn, Mich.
Hood Rubber Co., Watertown, Mass.
Manta-Vin Steel Corp., Chicago
Navaco Inc., Dallas
North East Laminates Inc., Methuen, Mass.
Outers Laboratories, Onalaska, Wis.
Panel-Fab Products Inc., Miami, Fla.
Plasteel Products Corp., Washington, Pa.
Poloron Products Inc., New Rochelle, N. Y.
Reiss Associates Inc., Lowell, Mass.
Seiberling Rubber Co., Barberton, Ohio
Shwayder Bros. Inc., Detroit
Stran-Steel Corp., a division of National Steel Corp., Detroit
Sun Steel Co., Chicago
Thomas Strip Div., Pittsburgh Steel Co., Warren, Ohio
United States Steel Corp., Pittsburgh

*This partial list is reported by leading suppliers of plastic materials.

• The laminating of sheets and coils has been speeded up the last year or so. Improvements are also reported in thermosetting adhesives.

Extra strong epoxy resins have been developed, an improved stain resistant vinyl sheeting is now available, and progress is reported in developing formulas that will withstand outdoor exposure. Welding difficulties are being overcome with magnetic force projection series welding.

At least 26 companies are producing, or licensed to produce, plastic coated sheets and strip, say plastic material suppliers (see list). There are few job coating shops, but it is said that jobbing plants having continuous coil and steel sheet painting lines can easily convert to the application of vinyl coating.

In addition to sheet metal coaters, several firms are turning out plastic coated steel pipe. They include: Republic Steel Corp., Cleveland (outside surface coated), Jones & Laughlin Steel Corp., Pittsburgh (inside surface coated), and Tube Coat Co., Houston. This area of production is expected to get more attention from other pipemakers. Republic already has announced a $2 million expansion of its pipe coating facilities at Youngstown.

• Most plastic coated steel products are marketed direct by the producers, either as flat sheets, in coil form, or as fabricated parts.

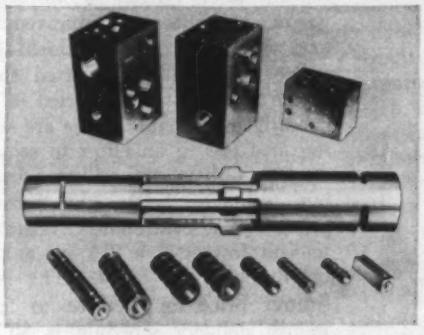
Metal is to customers' specifications, not being offered on a distributor basis in standard sizes and patterns. But C. M. Merritt, J&L's general manager-sales, sees no reason why it can't be handled by steel service centers.

Being a custom product, it's impossible to arrive at a representative market price for plastic coated metal. Much depends on the backing used, such as the gage of the steel or other metal used as base, the quality and type of base metal, and whether both sides are coated. The current price paid by the television industry is said to range between 30 and 35 cents a square foot.

Mr. Merritt says that originally vinyl laminate was priced on a square foot basis, plus the applicable price of the steel. The price for the laminate varied with the type of covering specified, due to the vari-

How Cadillac Gage MICROHONES Drilled Bores in Hydraulic Units

Here's how Cadillac Gage Company uses just drilling and Microhoning to secure higher production, reduce costs and obtain high accuracy in producing precision bores for hydraulic units that control gun elevation and traverse of gun turrets on military tanks.



This representative range of sleeves and other hydraulic components include both soft and hardened steels.

MMT-PE

Microhoning Bores in Hard Steel

Following the drilling operation, bores are Microhoned in at least eight different sizes of sleeves that are hardened to 63 R "C". Bore diameters range from .250″ to .875″ and in lengths up to 5.50″. From .008″ to .010″ of stock is removed in an average Microhoning cycle of about two minutes. A surface finish of four microinches, rms, is consistently obtained while generating roundness and straightness within 20 millionths of an inch tolerance over the full length of the bore. Also, because the free-floating Microhoning tool follows the neutral axis of the drilled hole, the bore location remains unchanged.

Microhoning Bores in Soft Steel

Another component of these hydraulic units is a cylinder whose bore is 1.625″ in diameter and 19″ long. Because the maximum stroke of the Hydrohoner machines being used is 15″, the cylinder is turned end-for-end during the Microhoning of the bore. Following a deep-hole drilling, Microhoning removes from .012″ to .015″ of stock in generating a controlled surface finish and correcting geometric inaccuracies.

Microhoning Blind-End Bores

In addition to bores in hardened steel sleeves and soft steel cylinders, Cadillac also Microhones several bores in soft steel valve bodies. One of these is a blind-end bore. It is .625″ in diameter, 1.75″ long and has a $\frac{1}{16}$″ relief at the bottom. Microhoning is specified to hold geometric tolerances within .0001″.

In the processing of precision bores in a variety of components for hydraulic units, Cadillac Gage is giving versatile and tangible expression to "precision production through Microhoning."

MICROMATIC HONE CORP.

8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN

ables in vinyl prices. Today, especially in the case of roll coated or sprayed vinyl, pricing is on a 100 lb basis.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 113 & 114

Sheet order entry has declined appreciably, but there has been no letup in production of cold rolled. Barring sharp curtailment of auto production, the market will remain tight through most of the second quarter.

Shipments continue on a high level, but the pace is less brisk than it was a month ago. Reason: Consumers are not pressing for deliveries like they were after the strike. They've been able to rebuild stocks more rapidly than had been expected.

With demand prospects less promising, particularly from the automotive and household appliance fields, producers of hot and cold rolled sheets have eased allocations for second quarter. They are soliciting orders actively for May and June shipment.

Galvanized sheets continue in tight supply, the mills reporting demand far greater than they can handle in the second quarter. The auto industry is using more galvanized this year.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 113

Highway construction, school projects, and other public work promise to provide a strong demand for reinforcing steel bars in the months ahead. On the West Coast, it's reported that 20,000 tons of steel, about 75 per cent of it reinforcing bars, will be required for three Titan missile launching bases in Idaho.

Distributor's stocks of re-bars, supplemented by imported tonnage, are reported ample to meet seasonal requirements in coastal areas. In New England, highway and bridge estimating is heavier, but at current prices some district distributors are reluctant to compete for formed and fabricated material. This includes school and bridgework.

Prices on Imported Steel Are Reduced Sharply

Prices on imported steel from Western Europe have declined further. Deformed bars are off almost $13 a ton. Bar size angles, structural angles, I-beams, and channels are down $6. Plates, merchant bars, and barbed wire are also off $6 a ton, while nails are quoted $4 a ton lower (see Page 118 for latest quotations).

The easing in prices reflects slower demand for imported items as domestic steel supplies get back to normal. Delivery promises on European steel range six to eight weeks, a noticeable improvement over what they were a month ago.

Brokers handling imported steel in the Southwest are reported to be running into trouble. Some are selling at a loss in an effort to reduce stocks. Others are selling incoming tonnages below the futures price. One warehouse operator tells of buying 2 x 2¼ in. angles off the boat for $5.50. The best futures price on a three to four month delivery schedule is $5.70. The broker who sold tonnage at $5.50 is reported to have paid close to $6 for the material when it was ordered three months ago.

Sharper declines in foreign mill prices are expected by midsummer.

Tin Plate . . .

Tin Plate Prices, Page 114

Shipments of metal cans in December came to 316,331 tons, bringing the total for the year to 4,944,817 tons, reports the U. S. Census Bureau. The 1958 figure was 4,760,704 tons. Shipments of fruit and vegetable cans in the year amounted to 1,561,976 tons vs. 1,559,758 the year before. Beer can shipments were 901,127 tons vs. 820,480.

Steel Bars . . .

Bar Prices, Page 112

There are still some openings in hot carbon bar schedules permitting the placing of April delivery tonnage. The mills are actively soliciting orders of May and June shipment. Alloy specialties and tool steels are in relatively easy supply.

While over-all business in bars remains good, sellers are disappointed with automotive buying. They also say demand from the fastener makers is tapering off.

Small arms, rifle, and machine guns account for steady demand for bars in New England. Second quarter orders are slackening in other directions, and distributors are revising their earlier requirement estimates.

The Navy closes Feb. 29 and Mar. 4 on 1050 tons of bars, including 105 tons of stainless.

Tubular Goods . . .

Tubular Goods Prices, Page 116

Oil country goods sales are off sharply, partly due to seasonal factors and tighter credit policies adopted by tubemakers this month. Some distributors are scaling down their orders, planning to carry smaller inventories. They'll make greater use of mill-operated downriver terminals.

Tubemakers are producing oil country tubing and casing at a near-capacity rate and will continue to operate at a high level during March. But much of their output is destined for downriver terminal stocks.

U. S. well drilling continues to lag. Hughes Tool Co.'s latest survey shows 1678 rotary rigs operated in the week ended Feb. 8, down 32 from the preceding week.

Makers of buttweld standard pipe are rapidly catching up with back orders. Small seamless pipe is the only product in the standard pipe category that's still in tight supply.

Plates . . .

Plate Prices, Page 112

Sheared plates are readily available for April delivery. Spot openings in schedules, due to deferments and cancellations, have enabled some producers to enter a little new tonnage for March shipment.

Ship needs remain sluggish (largely because of the strike at Bethlehem's eastern yards). Fabrication pipe demand also lags. One pipe mill has about a month's work on hand. Tank jobs are spotty, with fabricators having difficulty in building backlogs. They are offering bargain prices but are not attracting much new business.

Pittsburgh area plate sellers say consumption is falling short of expectations. They note "fairly good

size" cancellations from tankmakers, structural fabricators, and auto frame shops. But one area sales executive predicts second quarter plate production will average 75 to 80 per cent of capacity.

Steel Shipments in 1959 Score 16 Per Cent Gain

Finished steel product shipments from the mills during 1959 totaled 69,377,067 net tons, reports the American Iron & Steel Institute. The total is 16 per cent greater than the 59.9 million tons shipped during 1958, but is 18 per cent below the record 84.7 million tons moved in 1955.

December shipments of 8,211,047 tons compared with 4.8 million during November, 5.5 million in December, 1958, and with 9.7 million in the record month, June, 1959.

The following table lists the principal products shipped during 1959 and in December:

Products	Total, 1959 (Net tons)	December, 1959 (Net tons)
Cold rolled sheets	12,751,072	1,598,519
Hot rolled sheets	7,844,519	956,486
Hot rolled bars*	6,936,291	900,775
Plates	5,819,156	753,650
Elec. tin plate	4,858,511	464,080
Shapes (heavy)	4,090,535	525,944

* Including light shapes.

The market classifications receiving the largest tonnages for the year and in December were:

Markets	Total, 1959 (Net tons)	December, 1959 (Net tons)
Automotive	14,206,926	1,795,729*
Warehouses	13,039,555	1,595,931
Construction†	8,516,352	998,378
Containers	6,317,808	632,870
Machinery, etc.	4,158,903	482,599
Contractors' Products	3,574,802	424,614

† Including maintenance.

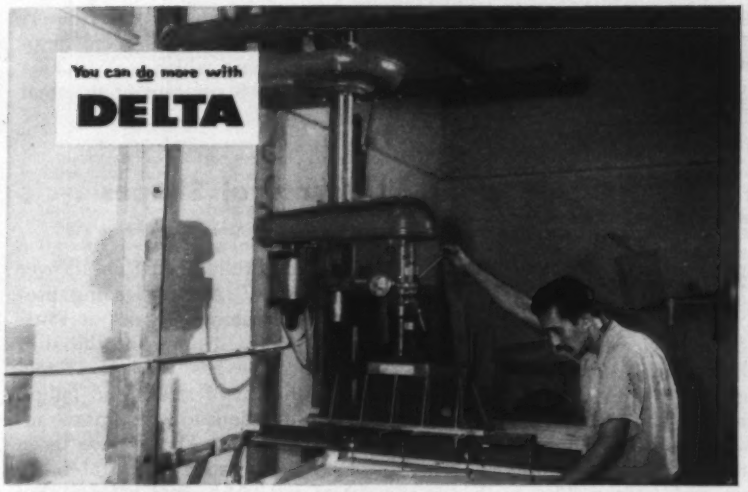
* Automotive take was record breaking in December, topping the prior monthly record (set in June, 1959) by nearly 24,000 tons.

Wire . . .

Wire Prices, Pages 114 & 115

Most wire manufacturers are heavily booked into April on manufacturers grades and wire rods, but they can give deliveries in two to three weeks on merchant wire orders.

Wire required for reinforcement is in heavier demand. Fastener needs are also up, but the mills have reduced shipments to normal lead-



Cuts drilling costs 50%

To boost output and increase accuracy, the S & S Visual Company of Brooklyn, N.Y. suspended a standard 17" Delta drill press from an angle iron wall bracket. Use of a Commander multiple spindle drill head permits simultaneous drilling of up to 15 holes in 30" x 60" display panels. Relatively inexpensive installation cost less than $1000, quickly paid for itself by *doubling* production.

This is typical of the way rugged, versatile Delta Industrial Tools are being used in thousands of plants to supplement or replace costly single purpose machines. For free 64-page illustrated booklet of valuable cost-cutting ideas, write: Rockwell Manufacturing Company, Delta Power Tool Division, 638B N. Lexington Ave., Pittsburgh 8, Pa. In Canada, Rockwell Manufacturing Company of Canada, Ltd., Guelph, Ontario.

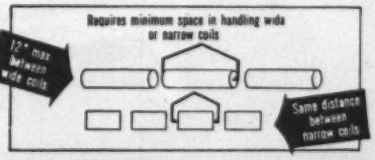
Handling Coil Stock?

CHECK THESE

C-F LIFTER ADVANTAGES

- 1 Lifter handles wide range of coil sizes
- Requires minimum of only 10" to 12" between piles —saves storage room
- 1 man operation — eliminates hookers
- Positive grip on coil — no damage to material

• C-F Coil Lifters are saving time and labor in many plants and warehouses because they can pick up, carry and set down a coil of steel faster and safer than any other method. Infinite jaw openings permit handling a very wide range of coil widths . . . carrying legs open fast, stay open until operator closes them on coil. Narrow legs require minimum space between piles – a space saving advantage. Made in motorized models for crane cab or pendant operation as well as manual types with chain wheel, in capacities from 3 tons up. Powered Rotating Heads available. Opening ranges to suit your requirements. Write for illustrated Bulletin.



CULLEN-FRIESTEDT CO.

1308 South Kilbourn Avenue • Chicago 23, Illinois

time on most products. High carbon wire orders for springs are slower because most springmakers have rebuilt their inventories.

Tennessee Coal & Iron Div., U. S. Steel Corp., Birmingham, has booked 19.2 million ft of steel wire strand for the U. S. Engineer, Memphis, Tenn.

Distributors . . .

Prices, Page 117

Steel service centers are booking a little more business each day, and the trend is expected to continue into March. The pickup follows disappointing order volume recently. In some districts, low priced imported steel and unfavorable weather are restricting sales.

Aside from a scarcity in sheets, especially galvanized, inventories are in good shape. Users are able to get delivery on most grades and sizes as needed.

Steel service centers ranked second last year as an outlet for the products of the mills. Their take was 13,039,555 net tons. This was 19.2 per cent of total mill shipments of 69,377,067 tons. Distributors were outranked only by the automotive industry which took 14,206,926 tons, 20.9 per cent of the total mill deliveries.

Structural Shapes . . .

Structural Shape Prices, Page 112

"Things are loosening up all over the country," says a leading producer of structural shapes at Pittsburgh. Two reasons for the shift toward a buyer's market: Rapid replenishment of stocks and failure of consumption to live up to advance billing. There have been cancellations from structural fabricators and auto frame builders, but not all mills are free of allocations.

Demand is expected to pick up as spring approaches. Inquiry for steel on public work is on the uptrend. The largest single pending project in the country is the Narrows Bridge, New York. Bids have just been closed on 41,000 tons, stringers and cables; bids will be closed this week on 53,000 tons of tower steel.

Plain material deliveries continue easy. Wide flange sections are available in early April and standard shapes in late March.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3650 tons, sulfur filtration plant, Texas Gulf Sulphur Co., Beaumont, Tex., to Consolidated Western Steel Div., U. S. Steel Corp., Houston.

1300 tons, First National Bank, New Haven, Conn., to Topper & Griggs (Bethlehem Fabricators Inc.), Hartford, Conn.

1100 tons, plant, Whitman Chocolate Corp., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, angles, General Stores Supply Office, Navy, Philadelphia, to Pine Steel Div., South Asia Corp., New York.

208 tons, angles, General Stores Supply Office, Philadelphia, to Oregon Steel Div., Gilmore Steel Corp., Portland, Oreg.

200 tons, women's dormitory, Furman University, Greenville, S. C., to Bibb Street Co., Macon, Ga., through A. C. Samford Inc., Albany, Ga., general contractor.

180 tons, wide flange, General Stores Supply Office, Navy, Philadelphia, to Bethlehem Steel Export Corp., New York.

154 tons, angles, Navy General Stores Supply Office, Philadelphia, to Oregon Steel Mills Div., Gilmore Steel Corp., Portland, Oreg.

100 tons or more, crane for Tacoma's Mayfield powerhouse, to Star Iron & Steel Co., Tacoma, Wash., at $120,800.

STRUCTURAL STEEL PENDING

6500 tons, tunnel under Elizabeth River,

EXECUTIVE REPORT #5

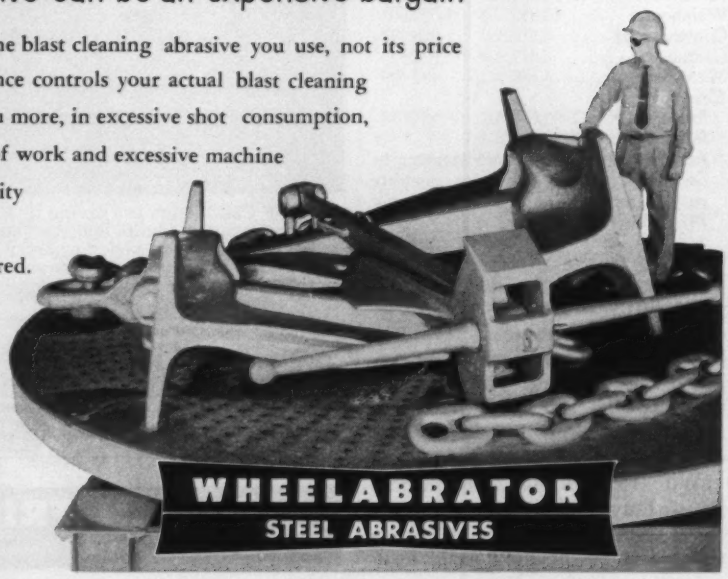
DON'T SAVE PENNIES TO LOSE DOLLARS

the lowest-priced abrasive can be an expensive bargain

Your real concern is the *ultimate cost* of the blast cleaning abrasive you use, not its price per ton. Abrasive quality and performance controls your actual blast cleaning costs. Lower priced abrasives can cost you more, in excessive shot consumption, lower production volume, poor quality of work and excessive machine maintenance. In case after case, high quality Wheelabrator Steel Shot has proven to be the *lowest-cost* abrasive, all factors considered.

You can prove the savings you'll make with Wheelabrator Steel Shot

Your Wheelabrator Abrasive Engineer will demonstrate the performance of Wheelabrator Steel Shot in your own plant. For details write to Wheelabrator Corp., 509 S. Byrkit St., Mishawaka, Ind. In Canada, P.O. Box 490, Scarborough, Ontario.



Portsmouth, Va.; bids closed Feb. 17.

4770 tons, state bridgework, Kings County, New York, Slattery Contracting Co. and Slattery Terminal Corp., low, jointly, on the general contract.

3000 tons, three Titan missile projects near Mountain Home Air Base, Idaho; bids in to the U. S. Engineer, Walla Walla, Wash.

2500 tons, police academy, Queens, New York; bids closed Feb. 17.

2070 tons, state bridgework, Monroe County, New York; bids closed Feb. 18.

1800 tons, Washington State, Columbia River toll bridge at Biggs Rapids; Paul Jarvis Inc., Seattle, is low at $2,409,163; also, 450 tons of reinforcing bars involved; action postponed until Toll Bridge Authority completes financing.

1600 tons, building No. 9, State College campus, Albany, N. Y.; bids Mar. 9.

1300 tons, state bridgework, FICBE 60-1, New York County, New York; Johnson, Drake & Piper, New York, low on the general contract.

1090 tons, Colgate Palmolive Research Center, Piscataway Township, New Jersey; Turner Construction Co., New York, contractor in charge.

660 tons, Anacostia Freeway, Washington; Tidewater Construction Co., Baltimore, low on the general contract.

575 tons, addition, radio receiver plant, General Electric Co., Utica, N. Y.; bids Feb. 24.

570 tons, including 237 tons of high tensile, Navy Purchasing Office, Washington; bids Feb. 15.

380 tons, men's dormitory, Temple University, Philadelphia; bids Feb. 16.

350 tons, three span bridge, Weare, N. H.; Perini Corp., Framingham, Mass., low bidder.

350 tons, tower steel, f.o.b. Pasco, Wash.; bids to Bonneville Power Administration, Portland, Oreg., Mar. 9.

350 tons, science building, Portland College; bids to Portland, Oreg., Feb. 25.

342 tons, state bridgework, Bergen and Passaic counties, New Jersey; bids Mar. 2.

316 tons, Washington State, Cowlitz River bridge; general contract to Anderson Bridge Co., Tacoma, Wash., low at $756,238.

294 tons, two 3-span composite wide flange beam bridges, Waterbury-Bolton, Conn.; bids Feb. 26, Hartford, Conn.; also 204 tons, concrete reinforcing bars.

185 tons, state bridgework, FARC 60-16, Essex County, New York; bids Feb. 18.

172 tons, state bridgework, FARC 60-15, Steuben County, New York; bids Feb. 18.

165 tons, state bridgework, Elk County, Pennsylvania; bids Mar. 11.

150 tons, also 2400 ft of steel piling, three bridges in Alaska; bids to the Department of Commerce, Juneau, Alaska, Mar. 1.

125 tons, state bridgework, New Castle County, Delaware; bids Feb. 10.

60 tons, 4 story addition to Securities Bldg., Seattle; bids Feb. 25; Bittman & Sanders, Seattle, architects.

REINFORCING BARS . . .

REINFORCING BARS PLACED

20,000 tons, including structurals and plates, three Titan missile launching bases, near Mountain Home, Idaho; reported materials will be government furnished, procured by the Omaha district office of the U. S. Engineer.

918 tons, Niagara Parkway viaduct, Cleveland-Bellevue Avenues, Niagara Falls, N. Y., New York State Power Authority, to Bethlehem Steel Co., Bethlehem, Pa.; Coleman Bros. Corp., Readville, Maine, general contractor.

715 tons, steam plant, Green River, Tennessee Valley Authority, Paradise, Ky., to Glazer Steel Corp., New Orleans.

670 tons, classroom building, North Carolina State College, Raleigh, N. C., to Virginia Steel Co., Richmond, Va.; T. A. Loving & Co., Goldsboro, N. C., general contractor; structurals to J. D. Wilkins Co.

475 tons, high school, Biloxi, Miss., to Southern Independent Sales Co., New Orleans, through G. E. Bass Construction Co., Jackson, Miss., general contractor.

448 tons, women's dormitory, Furman University, Greenville, S. C., to Southern Steel Products Co., Gastonia, N. C.; A. C. Samford Inc., Albany, Ga., general contractor. struction Co., Boston, general contractor.

390 tons, high school, Burlington, Mass., to Northern Steel Inc., Boston, through Vara Construction Co., Boston, general contractor.

300 tons, building, State Teachers College, Framingham, Mass., to Northern Steel Inc., Boston, through L. & R. Construction Co., North Reading, Mass., general contractor.

235 tons, Washington State, King County freeway section, to J. D. English Steel Co., Tacoma, Wash.; Northwest Construction Co., Seattle, general contractor; Woodworth & Co., Tacoma, subcontractor.

REINFORCING BARS PENDING

14,000 tons, three complexes, Titan missile projects, near Mountain Home Air Base, Idaho; joint low bid is $28,899,000 by Kaiser, Raymond, Maoco, Puget Sound, Oakland, Calif.

470 tons, Mill Brook stream structures, Worcester, Mass.; bids Feb. 16, Boston.

450 tons, Montana State highway projects in Silver Bow, McCone, Fergus, and Cascade counties; bids to Helena, Mont., Feb. 17.

435 tons, Washington State, Cowlitz River bridge; bids in.

200 tons, also 30 tons of structurals and unstated pipe, Columbia Basin project; bids to Bureau of Reclamation, Ephrata, Wash., Mar. 24.

100 tons or more, Washington State therapy building; C. E. Skinner, Orting, Wash., low

EXECUTIVE REPORT #8

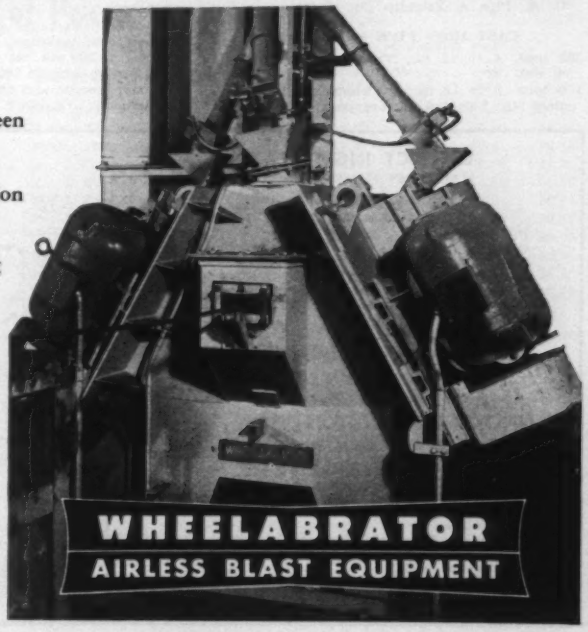
ROD DESCALING, COATING AND DRAWING IN ONE CONTINUOUS OPERATION

at Lamson & Sessions Co.

In their new and ultra-modern Cleveland plant, Lamson & Sessions Co. has proved that Wheelabrator straight-line blast descaling is the shortest distance between hot rolled rod and wire profits.

Their automated descaling line starts with hot rolled rod on a payoff reel (A), provides a portable welding station (B) for joining successive coils, passes through a snarl switch (C) and straightener-leveler (D), through the Wheelabrator blast descaling cabinet (E), through coating and drying equipment (F) and to the draw block and re-coil unit (G) — all in a straight line, with no interruption and no intermediate handling.

This efficient method is made possible by the speed and thoroughness of Wheelabrator airless blast descaling, which removes all scale or rust down to virgin metal, without acid pickling, at speeds as dictated by subsequent operations.



WHEELABRATOR method lets you automate your wire and bar drawing lines

With the Wheelabrator method, you can blast clean in line with patenting, cold drawing and cold heading. To see how many leading producers are saving with this system, write for Bulletin 148-D. Wheelabrator Corp., 509 S. Byrkit St., Mishawaka, Ind. Canadian Division: P. O. Box 490, Scarborough, Ont.

at $339,676 to the State. Department of General Administration.

100 tons or more, eight-story warehouse addition for Bon Marche, Seattle; plans in preparation by John Graham & Co., Seattle; bids soon.

60 tons, also pipe and miscellaneous; wasteways, Grant County, Washington State.

PLATES . . .

PLATES PLACED

4068 tons, General Stores Supply Office, Navy, Philadelphia, to Phoenix Steel Corp., Harrisburg, Pa.

607 tons, General Stores Supply Office, Navy, Philadelphia, to the Colorado Fuel & Iron Corp., Wilmington, Del.

343 tons, General Stores Supply Office, Navy, Philadelphia, to C. Itoh & Co. (America) Inc., New York; 207 tons, steel strapping to Independent Metal Strap Co. Inc., Brooklyn, N. Y.

238 tons, floor plate, General Stores Supply Office, Navy, Philadelphia, to Alan Wood Steel Co., Conshohocken, Pa.

197 tons, carbon, General Stores Supply Office, Navy, Philadelphia, to Phoenix Steel Corp., Harrisburg, Pa.

150 tons, alloy, General Stores Supply Office, Navy, Philadelphia, to Phoenix Steel Corp., Harrisburg, Pa.

140 tons, carbon and alloy, Naval weapons plant, Washington, to U. S. Steel Corp., Pittsburgh; also, three contracts for forgings to Bethlehem Steel Co., Bethlehem, Pa., at $207,198.

PLATES PENDING

750 tons, 110 in. outlet pipe, Navajo Dam, Colorado River storage project; bids Mar. 10, U. S. Department of Interior, Denver.

500 tons, aircraft refueling tank trucks, Mallory Air Force Base, Memphis, Tenn.; Consolidated Diesel Electric Corp., Stamford, Conn., contractor.

400 tons, five tanks, Texaco Co., Westville, N. J.

110 tons, city water tank, Salem, Oreg.; bids in.

100 tons, water tank; bids to Edmonds, Wash., Feb. 23.

100 tons or more, 16 pipeline pontoons; bids to the U. S. Engineer, Portland, Oreg., Mar. 3.

Unstated, 740 ft of 30 in. welded steel pipe; rebids to the Port of Portland, Oreg., Mar. 2.

PIPE . . .

CAST IRON PIPE PLACED

361 tons, 3 to 8 in., for Everett, Wash., to U. S. Pipe & Foundry Co., Seattle.

CAST IRON PIPE PENDING

392 tons, 4 to 12 in., Tacoma, Wash.; bids in Feb. 15.

115 tons, 8 to 12 in. for Enumclaw, Wash.; steel pipe bids low; award pending.

RAILS, CARS . . .

RAILROAD CARS PLACED

Illinois Central, 200 seventy-ton gondolas, to Bethlehem Steel Co.'s plant at Johnstown, Pa.

American Refrigerator Transit Corp., 100 refrigerator cars, to Pullman-Standard Div., Pullman Inc., Chicago.

Chicago, Rock Island & Pacific, 100 fifty-ton boxcars and one hundred 85 ft piggyback flatcars, to Pullman-Standard Div., Pullman Inc., Chicago.

Minneapolis, St. Paul & Sault Ste. Marie, ten 85 ft piggyback flatcars, to Pullman-Standard Div., Pullman Inc., Chicago.

January Steel Production Record 12,043,000 Tons

Steel production in January topped the 12 million ton mark for the first time, reports the American Iron & Steel Institute. Total for the month: 12,043,000 net tons. It compares with the previous monthly record of 11,989,319 tons set in December, 1959. In January, 1959, the furnaces poured 9,317,385 tons.

The institute's index of steelmaking for January was 169.3 (average production during 1947-49 equals 100). It compares with 168.5 for December, 1959, and 131.0 for January, 1959.

Based on the Jan. 1, 1960, capacity rating of 148,570,970 net tons annually, steelmaking operations averaged 95.4 per cent during January (for comparative data see table).

Steel Ingot Production—January, 1960

Period	OPEN HEARTH (Net tons)	BESSEMER (Net tons)	OXYGEN PROCESS (Net tons)	ELECTRIC (Net tons)	TOTAL (Net tons)	Percentage of capacity
1960						
†January	10,527,000	211,000	281,000	1,024,000	12,043,000	95.4
1959						
January	8,280,985	120,005	186,820	729,575	9,317,385	74.3
February	8,541,031	128,515	176,970	756,422	9,602,938	84.8
March	10,216,474	184,892	236,595	929,784	11,567,745	92.3
1st Qtr.	27,038,490	433,412	600,385	2,415,781	30,488,068	83.8
April	9,884,322	195,730	237,018	964,850	11,281,920	93.0
May	10,117,968	200,887	257,325	1,024,401	11,600,581	92.5
June	9,521,053	185,794	259,731	941,056	10,907,634	89.9
2nd Qtr.	29,523,343	582,411	754,074	2,930,307	33,790,135	91.8
1st 6 Mo.	56,561,833	1,015,823	1,354,459	5,346,088	64,278,203	87.8
July	4,541,741	66,433	98,634	525,368	5,232,176	41.7
August	1,171,342	.....	.....	267,935	1,439,277	11.5
September	1,249,398	.....	.....	285,619	1,535,017	12.7
3rd Qtr.	6,962,481	66,433	98,634	1,078,922	8,206,470	22.1
9 Mo.	63,524,314	1,082,256	1,453,093	6,425,010	72,484,673	65.6
October	1,385,490	.....	.....	319,043	1,704,533	13.6
November	6,290,659	92,361	129,794	754,793	7,267,607	59.9
*December	10,468,534	205,666	281,451	1,033,668	11,989,319	95.6
*4th Qtr.	18,144,683	298,027	411,245	2,107,504	20,961,459	56.3
*2nd 6 Mo.	25,107,164	364,460	509,879	3,186,426	29,167,929	39.2
*Totals	81,668,997	1,380,283	1,864,338	8,532,514	93,446,132	63.3

Note—The percentages are based on annual capacities as of Jan. 1, 1960: Open hearth, 126,621,630 net tons; bessemer, 3,396,000 net tons; basic oxygen process, 4,157,400 net tons; electric and crucible, 14,395,940 net tons. Total: 148,570,970 net tons. In 1959, the capacity tonnages were: Open hearth, 126,528,380 net tons; bessemer, 3,577,000 net tons; basic oxygen process, 4,033,160 net tons; electric and crucible, 13,495,130 net tons. Total: 147,633,670 net tons.
†Preliminary. *Revised.

DISTRICT INGOT RATES

(Percentage of capacity engaged)

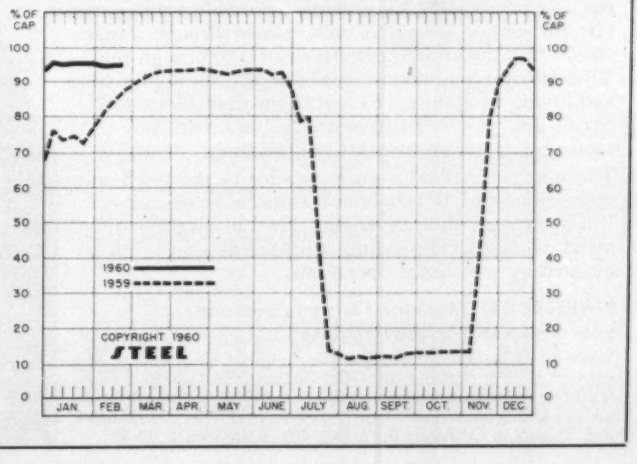
	Week Ended Feb. 21	Change	Same Week 1959	Same Week 1958
Pittsburgh	97.5	+ 1	87	56
Chicago	95.5	— 0.5	89	59.5
Eastern	96	0	85	68
Youngstown	95	0	80	54
Wheeling	95	0	87	58
Cleveland	100.5	— 1*	87	30
Buffalo	105	0	102.5	44
Birmingham	91.5	— 2*	79	47
Cincinnati	99	— 3	93	50
St. Louis	96	+ 5.5	89	80
Detroit	101	+ 4*	95	51
Western	94	+ 3	91	63
National Rate	94.5	+ 0.2*	86.5	50.9

INGOT PRODUCTION

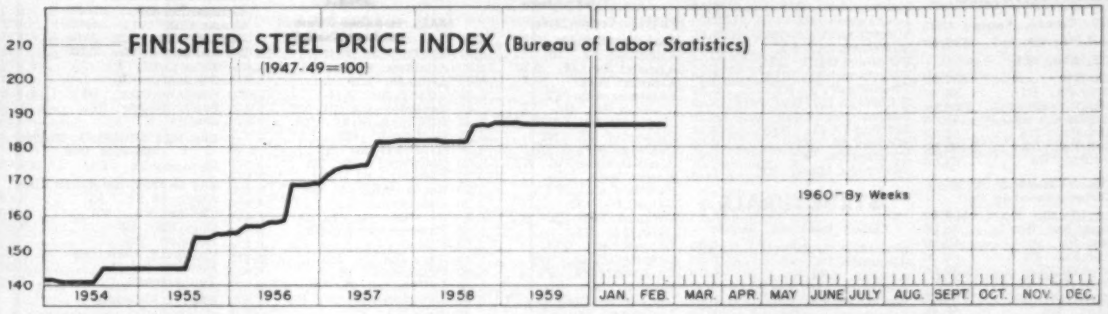
	Week Ended Feb. 21	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	167.6†	167.3	169.8	152.5
NET TONS (In thousands)	2,693†	2,687	2,727	2,449

*Change from preceding week's revised rate.
†Estimated by STEEL; comparative figures reported by AISI.
Weekly capacity (net tons): 2,849,306 in 1960; 2,831,331 in 1959; 2,699,173 in 1958.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Feb. 16, 1960	Week Ago	Month Ago	Jan. Index	Year Ago
186.8	186.8	186.8	186.8	187.0

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Feb. 16

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.765
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.585
		Pipe, Line (100 ft)	199.533
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200	Black Plate, Canmaking Quality (95 lb base box)	7.900
Tubing, Mechanical, Carbon (100 ft)	27.005	Wire, Drawn, Carbon	10.575
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608	Wire, Drawn, Stainless, 430 (lb)	0.665
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100	Bale Ties (bundles)	7.967
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800	Nails, Wire, 8d Common	9.825
		Wire, Barbed (80-rod spool)	8.766
		Woven Wire Fence (20-rod roll)	21.880

STEEL's FINISHED PRICE INDEX*

	Feb. 17 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	194.53
Index in cents per lb	6.713	6.713	6.713	6.713	5.270

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$117.82
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	39.67	41.50	42.33	42.50	36.17

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Feb. 17 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	5.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods, $\frac{1}{2}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton	Feb. 17 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	55.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.) deld., Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$40.50	$42.50	$42.50	$43.50	$36.50
No. 1 Heavy Melt, E. Pa.	40.00	41.00	42.00	40.00	38.00
No. 1 Heavy Melt, Chicago	38.50	41.00	42.50	44.00	34.00
No. 1 Heavy Melt, Valley	43.50	43.50	44.50	48.50	36.50
No. 1 Heavy Melt, Cleve.	40.50	40.50	41.50	44.50	34.00
No. 1 Heavy Melt, Buffalo	36.50	36.50	37.50	41.50	32.00
Rails, Rerolling, Chicago	61.50	63.50	62.50	64.50	49.50
No. 1 Cast, Chicago	50.50	53.50	55.50	49.50	40.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$13.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	25.25

Steel Prices

Mill prices as reported to STEEL, Feb. 17, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 113; footnotes, page 115.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ....$76.00

INGOTS, Alloy (NT)

Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Bartonville,Ill. K4 ...$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ...80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)

Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3 ..104.50
Ensley,Ala. T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 ....109.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 ....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14 119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 ....119.00
Warren,O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 ....122.50

SKELP

Aliquippa,Pa. J5 ....5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS

AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 ....6.40
Alton,Ill. L1 ....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 ....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N. J. R5 ....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 ....5.55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 ....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 ....5.50
Niles,Calif. P1 ....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago, Ill. U5, W14..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange

Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Sterling,Ill. N15 ....5.50
Weirton,W.Va. W16 ....5.50

Alloy Std. Shapes

Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes

Aliquippa,Pa. J5 ....8.05
Bessemer,Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.06
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 ....8.75
Munhall,Pa. U5 ....8.05
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 ....7.75
Struthers,O. Y1 ....8.05

H.S., L.A., Wide Flange

Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

PILING

BEARING PILES

Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 ....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ..5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 ....5.30
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 ....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B3 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2..5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron

Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.

Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer,Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2..7.95
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy

Aliquippa,Pa. J5 ....7.50
Claymont,Del. C22 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport,Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2..7.50
Youngstown Y1 ....7.50

FLOOR PLATES

Cleveland J5 ....6.375
Conshohocken,Pa. A3..6.375
Ind.Harbor,Ind. I-2 ....6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

PLATES, Ingot Iron

Ashland c.l. (15) A10 ..5.55
Ashland l.c.l. (15) A10 ..6.05
Cleveland c.l. R2 ....6.05
Warren,O. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon
(Merchant Quality)

Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 ....5.675
Canton,O(23) R2 ....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 ....5.675
KansasCity,Mo(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa. (23) C18 ..6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 ....6.375
Owensboro,Ky.(9) G8..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ....5.675
Seattle A24, B3, N15 ..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15 ..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11 ..6.375
Warren,O. C17 ....6.052
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 ....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 ....6.725
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Fairless,Pa. U5 ....6.875
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R.
High-Strength, Low-Alloy

Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9) S5 ..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ..5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 ....6.52
Seattle B3 ....6.425

BAR SIZE ANGLES; S. SHAPES
Wrought Iron

Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Loaded
(Including loaded extra)
Carbon

LosAngeles P2, S30 ..11.75*

Alloy

Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 ....8.25
Buffalo B5 ....7.70
Camden,N.J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 ....7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ....7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.65
Newark,N. J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ....8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon
(Turned and Ground)

Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 ....9.225
Detroit S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis F7 ....9.025
Hammond,Ind. J5, L2..9.025
Hartford, Conn. R2 ....9.325
Harvey,Ill. R5 ....9.025
Lackawanna,N.Y. B2 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ....9.025
Midland,Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 ....9.025
Warren,O. C17 ....9.025

Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Yougstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 ....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1 5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2 .5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14 .6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ...7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ....7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts. (4) C2 ....5.675
Franklin,Pa. (3) F5 ..5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O. (3) P11 ....5.575
Tonawanda (3) B12 ...5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ....5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ...5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 ....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 ....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 ....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky. (8) A10 ..5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ...6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ...6.275
SparrowsPoint,Md. B2 .6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2.6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C-16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg, Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..*6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Const Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
T2 Tenn. Coal & Iron
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.
V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.
W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2	5.10
Allenport, Pa. P7	5.10
Alton, Ill. L1	5.30
Ashland, Ky. (8) A10	5.10
Atlanta A11	5.10
Bessemer, Ala. T2	5.10
Birmingham C15	5.10
Conshohocken, Pa. A3	5.15
Detroit M1	5.10
Ecorse, Mich. G5	5.10
Fairfield, Ala. T2	5.10
Farrell, Pa. S3	5.10
Fontana, Calif. K1	5.825
Gary, Ind. U5	5.10
Ind. Harbor, Ind. I-2, Y1	5.10
Johnstown, Pa. (25) B2	5.10
Lackaw'na, N.Y. (25) B2	5.10
LosAngeles (25) B3	5.85
LosAngeles C1	8.60
Minnequa, Colo. C10	6.20
Riverdale, Ill. A1	5.10
San Francisco S7	6.60
Seattle (25) B3	6.10
Seattle N14	6.60
Sharon, Pa. S3	5.10
S. Chicago, Ill. W14	5.10
S. SanFrancisco (25) B3	5.85
SparrowsPoint, Md. B2	5.10
Torrance, Calif. C11	5.85
Warren, O. R2	5.10
Weirton, W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18	8.40
Farrell, Pa. S3	8.40
Gary, Ind. U5	8.40
Houston S5	8.65
Ind. Harbor, Ind. Y1	8.40
KansasCity, Mo. S5	8.65
LosAngeles B3	9.60
Lowellville, O. S3	8.40
Newport, Ky. A2	8.40
Sharon, Pa. A2, S3	8.40
S. Chicago, Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland, Ky., A10	7.575
Bessemer, Ala. T2	7.575
Conshohocken, Pa. A3	7.575
Ecorse, Mich. G5	7.575
Fairfield, Ala. T2	7.575
Farrell, Pa. S3	7.575
Gary, Ind. U5	7.575
Ind. Harbor, Ind. I-2, Y1	7.575
Lackawanna, N.Y. B2	7.575
LosAngeles (25) B3	8.325
Seattle (25) B3	8.575
Sharon, Pa. S3	7.575
S. Chicago, Ill. W14	7.575
S. SanFrancisco (25) B3	8.325
SparrowsPoint, Md. B2	7.575
Warren, O. R2	7.575
Weirton, W. Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10	5.35
Warren, O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn, Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover, O. G6	7.425
Evanston, Ill. M22	7.525
Farrell, Pa. S3	7.425
Follansbee, W. Va. W10	7.425
Fontana, Calif. K1	9.20
FranklinPark, Ill. T6	7.525
Ind. Harbor, Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport, Pa. E10	7.525
NewBedford, Mass. R10	7.875
NewBritain, Conn. S15	7.875
NewCastle, Pa. B4, E5	7.425
NewHaven, Conn. D2	7.875
NewKensington, Pa. A6	7.425
Pawtucket, R.I. R3	7.975
Pawtucket, R.I. N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale, Ill. A1	7.525
Rome, N.Y. (32) R6	7.425
Sharon, Pa. S3	7.425
Trenton, N.J. (31) R5	8.875
Wallingford, Conn. W2	7.875
Warren, O. R2, T5	7.425
Worcester, Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie, Pa. S18	15.55
Cleveland A7	15.55
Dover, O. G6	15.55
Farrell, Pa. S3	15.55
FranklinPark, Ill. T6	15.55
Harrison, N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville, O. S3	15.55
Pawtucket, R.I. N8	15.90
Riverdale, Ill. A1	15.55
Sharon, Pa. S3	15.55
Worcester, Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn, Mich. S3	10.80
Dover, O. G6	10.80
Farrell, Pa. S3	10.80
Ind. Harbor, Ind. Y1	10.80
Sharon, Pa. S3	10.80
Warren, O. R2	10.80

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	8.95	10.40	12.60	15.60	....
Farrell, Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria, O. S1	10.05	10.40	12.60	15.60	....
FranklinPark, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison, N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain, Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle, Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven, Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington, Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford, Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	0.80C	1.05C	1.35C
Bristol, Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria, O. S1	19.05	22.15	....
FranklinPark, Ill. T6	19.20	23.30	28.15
Harrison, N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer, Mass. W12	18.85	....	....
Trenton, N.J. R5	18.85	22.95	27.80
Worcester, Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

Weirton, W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2 .....8.175

STRIP, C.R. Electrogalvanized

Cleveland A7	7.425*
Dover, O. G6	7.425*
Evanston, Ill. M22	7.525*
McKeesport, Pa. E10	7.50*
Riverdale, Ill. A1	7.525*
Warren, O. B9, S3, T5	7.425*
Worcester, Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell, Pa. S3	7.50
Sharon, Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Farrell, Pa. S3	5.525
Riverdale, Ill. A1	5.675
Sharon, Pa. S3	5.525
Youngstown U5	5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$9.10	$9.35	$9.75
Fairfield, Ala. T2	9.20	9.45	9.85
Fairless, Pa. U5	9.20	9.45	9.85
Fontana, Calif. K1	9.75	10.00	10.40
Gary, Ind. U5	9.10	9.35	9.75
GraniteCity, Ill. G4	9.20	9.45	9.60
IndianaHarbor, Ind. I-2, Y1	9.10	9.35	9.75
Irvin, Pa. U5	9.10	9.35	9.75
Niles, O. R2	9.10	9.35	9.75
Pittsburg, Calif. C11	9.75	10.00	10.40
SparrowsPoint, Md. B2	9.10	9.35	9.75
Weirton, W.Va. W6	9.10	9.35	9.75
Yorkville, O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa, Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor, Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles, O. R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, Hot Dipped Common Coke

	1.25 lb	1.50 lb
Aliquippa, Pa. J5	$10.40	$10.65
Fairfield, Ala. T2	10.50	10.75
Fontana, Calif. K1	11.05	11.30
Gary, Ind. U5	10.40	10.65
Ind. Harb. Y1	10.40	10.65
Irvin, Pa. U5	10.40	10.65
Pitts., Calif. C11	11.05	11.30
Sp. Pt., Md. B2	10.40	10.65
Weirton, W.Va. W6	10.40	10.65
Yorkville, O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa, Pa. J5	$8.20
Fairfield, Ala. T2	8.30
Fairless, Pa. U5	8.30
Fontana, Calif. K1	8.85
Gary, Ind. U5	8.20
GraniteCity, Ill. G4	8.30
Ind. Harbor, Ind. I-2, Y1	8.20
Irvin, Pa. U5	8.20
Niles, O. R2	8.20
Pittsburg, Calif. C11	8.85
SparrowsPoint, Md. B2	8.20
Weirton, W.Va. W6	8.20
Yorkville, O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa, Pa. J5	7.85
Gary, Ind. U5	7.85
GraniteCity, Ill. G4	7.95
Ind. Harbor, Ind. Y1	7.85
Irvin, Pa. U5	7.85
Yorkville, O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary, Ind. U5	$10.05
Irvin, Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom, W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge, Pa. A4	....	....	12.40	13.55	14.65
GraniteCity, Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor, Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield, O. E6	9.875*	11.70	12.40	13.55	14.65
Newport, Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles, O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift, Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren, O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville, O. A10	....	11.70†	12.40	13.55	14.65
Vandergrift, Pa. U5					8.10
Mansfield, O. E6					8.10
Warren, O. R2 (Silicon Lowcore)					8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom, W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift, Pa. U5	15.70	16.30	16.80	17.85
Zanesville, O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)

	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	18.10	19.70	20.20	20.70	15.70††	
Butler, Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift, Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren, O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity, Ala. R2	8.00
Aliquippa, Pa. J5	8.00
Alton, Ill. L1	8.20
Atlanta A1	8.00
Bartonville, Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville, Ind. M8	8.10
Donora, Pa. A7	8.00
Duluth A7	8.00
Fairfield, Ala. T2	8.00
Fostoria, O. (24) S1	8.10
Houston S5	8.25
Jacksonville, Fla. M8	8.35
Johnstown, Pa. B2	8.00
Joliet, Ill. A7	8.00
KansasCity, Mo. S5	8.25
Kokomo, Ind. C16	8.10
LosAngeles B3	8.95
Minnequa, Colo. C10	8.25
Monessen, Pa. P7, P16	8.00
Palmer, Mass. W12	8.30
Pittsburg, Calif. C11	8.95
Portsmouth, O. P12	8.00
Rankin, Pa. A7	8.00
S. Chicago, Ill. R2	8.00
S. SanFrancisco C10	8.95
SparrowsPoint, Md. B2	8.10
Sterling, Ill. (1) N15	8.00
Sterling, Ill. N15	8.10
Struthers, O. Y1	8.00
Waukegan, Ill. A7	8.00
Worcester, Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria, O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville, Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora, Pa. A7	12.65
Duluth A7	12.65
Johnstown, Pa. B2	13.40
KansasCity, Mo. U3	12.90
Minnequa, Colo. C10	12.775
Monessen, Pa. P7, P16	12.65
Muncie, Ind. I-7	13.60
NewHaven, Conn. A7	12.95
Palmer, Mass. W12	13.70
Pittsburg, Calif. C11	13.45
Portsmouth, O. P12	12.65
Roebling, N.J. R5	12.95
SparrowsPt., Md. B2	13.50
Struthers, O. Y1	13.40
Trenton, N.J. A7	12.95
Waukegan, Ill. A7	12.65
Worcester, Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5	9.75
Alton, Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora, Pa. A7	9.75
Duluth A7	9.75
Johnstown, Pa. B2	9.75
KansasCity, Mo. S5, U3	10.00
LosAngeles B3	10.70
Minnequa, Colo. C10	9.95
Monessen, Pa. P7, P16	9.75
NewHaven, Conn. A7	10.05
Palmer, Mass. W12	10.05
Pittsburg, Calif. C11	10.70
Portsmouth, O. P12	9.75
Roebling, N.J. R5	10.05
S. Chicago, Ill. R2	9.75
S. SanFrancisco C10	10.70
SparrowsPt., Md. B2	9.85
Struthers, O. Y1	9.75
Trenton, N.J. A7	10.05
Waukegan, Ill. A7	9.75
Worcester, Mass. A7, J4	10.05

WIRE, MB Spring, High-Carbon

Aliquippa, Pa. J5	9.75
Alton, Ill. L1	9.95
Bartonville, Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora, Pa. A7	9.75
Duluth A7	9.75
Fostoria, O. S1	9.80
Johnstown, Pa. B2	9.75
KansasCity, Mo. S5, U3	10.00
LosAngeles B3	10.70
Milbury, Mass. (12) N8	10.05
Minnequa, Colo. C10	9.95
Monessen, Pa. P7, P16	9.75
Muncie, Ind. I-7	9.95
Palmer, Mass. W12	10.05
Pittsburg, Calif. C11	10.70
Portsmouth, O. P12	9.75
Roebling, N.J. R5	10.05
S. Chicago, Ill. R2	9.75
S. SanFrancisco C10	10.70
SparrowsPt., Md. B2	9.85
Struthers, O. Y1	9.75
Trenton, N.J. A7	10.05
Waukegan, Ill. A7	9.75
Worcester, Mass. A7, J4, T6	10.05

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1	16.50
Bartonville, Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville, Ind. M8	16.40
Fostoria, O. S1	16.30
Houston S5	16.55
Jacksonville, Fla. M8	16.65
Johnstown, Pa. B2	16.30
KansasCity, Mo. S5	16.55
Kokomo, Ind. C16	16.30
Minnequa, Colo. C16	16.55
Monessen, Pa. P16	16.30
Muncie, Ind. I-7	16.50
Palmer, Mass. W12	16.60
S. SanFrancisco C10	17.15
Waukegan, Ill. A7	16.30
Worcester, Mass. A7, J8	16.60

WIRE, Tire Bead

Bartonville, Ill. K4	17.15
Monessen, Pa. P16	17.15
Roebling, N.J. R5	17.65

ROPE WIRE (A)

Bartonville, Ill. K4	13.45
Buffalo W12	13.45
Fostoria, O. S1	13.45
KansasCity, Mo. U3	13.70
Johnstown, Pa. B2	13.45
Monessen, Pa. P7	13.45
Muncie, Ind. I-7	13.65
Palmer, Mass. W12	13.75
Portsmouth, O. P12	13.45
Roebling, N.J. R5	13.75
St. Louis L8	13.45
SparrowsPt., Md. B2	13.55
Struthers, O. Y1	13.45
Worcester, Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

Wire, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt., Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	9.24
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	9.94
Minnequa,Colo. C10	9.49
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	9.34
Sterling Ill.(37) N15	9.34

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	9.54
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	10.26
Minnequa,Colo. C10	9.79
Pittsburg,Calif. C11	10.28
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.64
Sterling Ill.(37) N15	9.64

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	9.59
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	10.37
Minnequa,Colo. C10	9.84
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.69
Sterling Ill.(37) N15	9.69

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193*
Aliquippa,Pa. J5	190‡
Atlanta A11	195‡
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196‡
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196‡
Pittsburg Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198‡
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190‡
Atlanta A11	192‡
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190‡
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)	An'ld Galv. Stone	Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.95	
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65‡
Kan.City,Mo. S5	18.10	
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.Calif. C11	18.20	19.75†
S.San.Fran.C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75‡
Waukegan A7	17.85	19.40†
Worcester A7	18.15	

WIRE, Merchant Quality

(6 to 8 gage)	An'd Galv.
Ala.City,Ala. R2	9.00 9.55**
Aliquippa J5	8.65 9.325‡
Atlanta(48)A11	9.10 9.775‡
Bartonville(48) K4	9.10 9.80
Buffalo W12	9.00 9.55†
Cleveland A7	9.00
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675‡
Joliet,Ill. A7	9.00 9.55†
KansasCity(48)S5	9.25 9.80**
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625‡
Minnequa C10	9.25 9.80**
Monessen(48) P7	8.65 9.35‡
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55**
S.SanFran. C10	9.95 10.50**
Spar'wsPt.(48)B2	9.10 9.775‡
St'ling(37)(48) N15	9.10 9.80
Struthers O. Y1	9.00 9.65‡
Worcester,Mass.A7	9.30 9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Consumer discounts, per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nuts 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

CAP AND SETSCREWS Fillister Head, Cap Screws, Coarse Thread:

Packages	+55
Bulk	+16
Flat Head Cap Screws: ¾ in. and smaller, 6 in. and shorter:	
Packages	+85
Bulk	+38
Setscrews, Square Head, Cup Point, Coarse Thread: Through 1 in. diam. 6 in. and shorter:	
Packages	+ 5
Bulk	+19
Through 1 in. diam., longer than 6 in.:	
Packages	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85
⅞ in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.00	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	28.95	43.40	55.40	73.00	95.10
Minnequa,Colo. C10	28.95	43.40	55.40	73.00	95.10
Roebling N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St. Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2 Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25 00	....	36 00	....	43.50	39.25	48.50	45.00
202	24 75	28.25	37.75	39 00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46 00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30 75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49 00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81 00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89 75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71 25	75.75	71 75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34 75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35 00	30.00	40.25	40.25
416	....	....	29 75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40 75	42 75	40 25	62 00	62.00
430	17.75	19.75	29 75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36 00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	28.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.55	....
Nickel	41.65	51.95	63.20	72.70	....
Nickel, Low Carbon	41.95	52.60	63.20	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	$38.80	$44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	66.00	66.50	66.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%, Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††		Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	9.80[a]	10.00[b]	10.06	....	11.45[c]	10.05[d]	11.80#	16.38	9.55	9.90[e]	10.50
Birmingham	9.43[a]	10.20[b]	....	....	10.91[c]	9.59[d]	13.14#	16.76	9.00	9.79[e]	10.90
Boston	10.07	11.42	11.77	53.50	12.17	10.19	13.30#	15.64	10.64	10.27	11.95
Buffalo	8.80[a]	9.95[b]	11.15	55.98	10.65[c]	9.00[d]	11.45#	15.40	9.25	9.00[e]	10.85[f]
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.58#	15.37	9.56	9.27	10.53
Cleveland	8.54[a]	8.79[b]	10.94	52.33	10.32[c]	8.75[d]	11.25#	15.16	9.39	8.71[e]	10.50[f]
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	9.65[a]	9.65[b]	....	52.00	10.85[c]	8.90[d]	13.10#	16.55	8.35	9.65[e]	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.82[2]	12.20	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.35	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.55	10.89	52.17	9.25	9.40	11.95#	15.48	9.10	9.15	10.40**
Pittsburgh	8.73[a]	9.88[b]	11.03	52.33	10.49[c]	8.85[d]	11.25#	15.05	9.00	8.68[e]	10.32[f]
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.72[a]	9.83	11.28	....	10.38	8.81[d]	9.78	15.43	9.48	8.84[e]	10.43[f]
St. Paul	8.80[a]	9.31[b]	10.54	....	10.32[c]	8.70[d]	11.49#	16.54	9.38	8.60[e]	10.49
San Francisco	9.65	11.10	11.55	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[2]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane, Wash.	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **¼ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.

[a]10 Ga.; [b]20 Ga.; [c]¼ x 1 in.; [d]¾-2½ in.; [e]¼ x 84 in.; [f]¼ x 36 in.

Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [3]—1000 to 4999 lb; [5]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid $26.50-$27; barge, Brownsville, Tex., $29-$29.50.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.80
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	21.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$17.50-18.00*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian 88-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.00†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.50-2.75
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches—Diam	Inches—Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85§
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.75
Unannealed (99+% Fe)	33.25
Unannealed (99+% Fe) (minus 325 mesh)	58.25
Powder Flake (minus 16 plus 100 mesh)	29.25
Carbonyl Iron: 98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum freight allowed, c.l. 38.50; ton lots 40.50	
Antimony, 500-lb lots	42.00*
Brass, 500-lb lots	35.60-52.90†
Bronze, 5000-lb lots	54.00-57.60†
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 35 mesh	$1.00
Nickel	$1.15
Nickel-Silver, 5000-lb lots	60.90-69.70†
Phosphor-Copper, 5000-lb lots	67.00
Copper (atomized) 5000-lb lots	47.50-65.50
Solder	7.00*
Silicon	70.00*
Stainless Steel, 304	89.00*
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	21.20-34.40‡

Tungsten:	Dollars
Carbon reduced, 98.8% min., minus 65 mesh	nom**
Chromium electrolytic 99.8% Cr, min., metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	*$5.95*	*$6.00*	*$5.85*	*$5.70*	*$6.10*
Bar Size Angles	*5.95*	*6.00*	*5.85*	*5.75*	*6.10*
Structural Angles	*5.86*	*5.91*	*5.76*	*5.66*	*6.01*
I-Beams	*5.86*	*5.91*	*5.76*	*5.66*	*6.01*
Channels	*5.86*	*5.91*	*5.76*	*5.66*	*6.01*
Plates (basic bessemer)	*5.98*	*6.03*	*5.88*	*5.78*	*6.13*
Sheets, H.R.	7.50	7.55	7.40	7.30	7.65
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	9.70	9.75	9.60	9.50	9.85
Sheets, Galv. (in. coils) 20 Ga., 48 in. wide	9.80	9.85	9.70	9.60	9.95
Sheets, C.R. (drawing quality)	10.70	10.75	10.60	10.50	10.85
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.08	24.20	24.42	24.15	25.47
Barbed Wire (†)	*6.50*	*6.55*	*6.40*	*6.30*	*6.65*
Merchant Bars	*6.39*	*6.44*	*6.29*	*6.19*	*6.54*
Hot-Rolled Bands	7.90	7.95	7.80	7.70	8.05
Wire Rods, Thomas Commercial No. 5	6.60	....	6.45	6.45	6.70
Wire Rods, O. H.	7.05	....	6.90	6.90	7.15
Bright Common Wire Nails (§)	*7.95*	*8.00*	*7.85*	*7.75*	*8.10*

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	5.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per net ton bulk, f.o.b. cars or trucks, plant	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs per gross ton. Palmerton, Pa. 21-23% Mn, $102.50, 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net tons, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of aloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35 less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c.

Blocking Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c; No. 2 (Cr 58-63%, C 5-6%, Si 8-10%), 23.00c; No. 3 (Cr 58-63%, C 5-6%, Si 10-12%), 23.00c.

Refined Charge Chrome: No. 1 (Cr 50-55%, C 5% max, Si 2% max), 25.00c; No. 2 (Cr 56-60% C 5% max, Si 2% max), 25.00c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 35.75c per lb contained Cr; 0.010% max, 36.75c. Delivered.
Cr 67-71%, carload, lump, bulk, 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 26.25c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 28.25c per lb contained Cr, 14.60e per lb contained Si; 0.75 in. x down. 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.
Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al 40%, Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3% lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l., packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb of briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carlot bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

Scrap Price Drops in Slow Market

STEEL's composite on No. 1 heavy melting grade declines another $1.83 a ton to $39.67, lowest since early September, 1959. Supplies are increasing, with buying lacking

Scrap Prices, Page 122

• **Chicago**—Prices are off an average of $2 a ton. A few items are down as much as $3. Steelmaking, blast furnace, and foundry grades are affected. At the start of the month, one mill reduced its buying price for No. 1 industrial heavy melting steel from $44 to $43. Now it has cut the price to $41 and is declining most offerings at that figure. No. 1 dealer heavy melting is off $8 a ton from the $45 price quoted in mid-November, shortly after the end of the steel strike. Contributing to the plight of dealer scrap: Abundant supplies of industrial material, good mill inventories, and heavy use of blast furnace hot metal.

• **Pittsburgh** — There's a buyer's market here, but nobody is buying. The Pennsylvania Railroad sold No. 1 heavy melting to brokers for $45.30 (vs. $49 a month ago). Most dealer grades are lower on appraisal. Small quantities of No. 1 heavy melting have reportedly been sold for $40. One mill is offering only $36 for that grade and $27 for No. 2 bundles. In a recent sale, more than 2000 tons of No. 1 dealer bundles went to a consumer for $41.

• **Philadelphia** — Domestic demand is lagging, and export requirements are off. As a result, prices have slipped. No. 1 heavy melting is being quoted at $40, delivered; No. 2 heavy melting at $35; No. 1 bundles at $44; and electric furnace bundles at $46—a reduction of $1 a ton on each grade. Heavy turnings have also declined, now being quoted $31-$34 delivered; structurals and plates are off to $46-$48; couplers, springs, and wheels are down to $49; rail crops to $66-$67; and drop broken machinery to $53.

• **New York** — Brokers' buying prices are unchanged, but they are soft. Domestic business lags badly in the steel grades. Scrap supplies are expected to increase as spring approaches.

• **Cleveland**—Prices are unchanged but are nominal in the absence of representative mill buying. There is spotty buying of the cast iron grades by the foundries. Monthend bids on the auto lists may show little change from those of a month ago. Reason: It's thought that tonnage offered will be down somewhat.

Brokers in the Youngstown area are reported to be piecing out their commitments with purchases of No. 1 heavy melting dealer scrap at $40-$42.

• **Detroit**—Prices are down as dealers and brokers view the outlook for the next quarter with considerable pessimism. The only sizable

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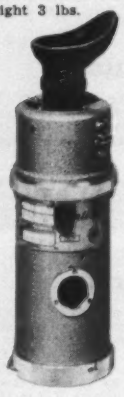

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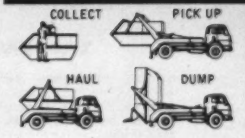

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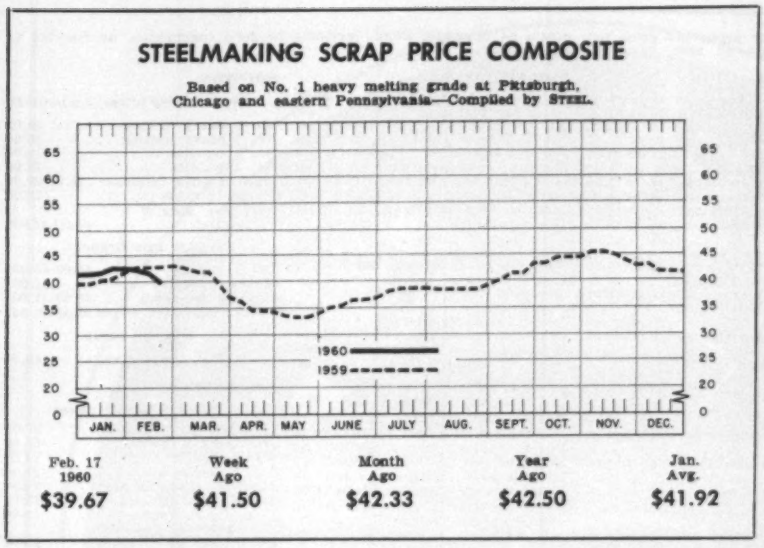

orders have been for No. 2 bundles. Turnings are slow and the outlook is for the market to soften another dollar or two before monthend auto lists come out.

• **Buffalo**—The market is weaker, and dealers are anticipating price declines on the chief steel mill grades when new orders are placed, probably at the end of this month. The large volume of industrial scrap available in the district is depressing the dealer market. Cast iron scrap prices are holding on sales to foundries.

• **Cincinnati**—The market is quiet, and prices are weak. No new mill buying is reported, and brokers' quotations have started to slip. No. 1 heavy melting is off $1 a ton to $36-$37, and other grades are similarly lower.

• **St. Louis**—There is little activity in this market. The mills are buying only small tonnage. Prices are down $1 to $2 a ton on most categories, reflecting lack of demand and plentiful supplies.

• **Birmingham**—Prices on the cast iron grades are holding, though buying is light, and there are some signs of weakness. At Tennessee River points the weakness in northern markets is reflected in lower prices. No. 1 heavy melting for export is now quoted at $39 f.a.s. most south Atlantic and Gulf ports.

• **Houston**—Limited buying for export constitutes the chief activity in this market. With scrap supplies increasing, shippers are worried about the prospects for March demand.

• **Los Angeles** — Foundries seeking to hold down inventories until after the local tax date in March are buying only hand-to-mouth tonnages. Export prices have been cut $3 a ton by Japanese buyers.

• **San Francisco**—Prices are holding at the recently established lower levels, but the tone of the market is soft. Export demand is holding up well, but there's a large tonnage accumulation on docks awaiting handling. Adverse weather has kept incoming shipments down.

• **Seattle**—The market is soft. Not much tonnage is moving, with mills still holding substantial stocks. Yard activity is below normal. A shipload of scrap is being assembled at Portland, Oreg., for early shipment to Japan.

Ferrous Scrap Stocks Hit Record in November

Consumers' stocks of ferrous scrap increased in November for the sixth straight month. At the start of December they stood at 8,863,-911 gross tons. That total is the largest reported since the Bureau of Mines inaugurated the present series of statistics in July, 1941. Based on November daily consumption of 159,897 tons, stocks at the end of that month were equal to a 55 day supply.

Pig iron stocks held by consumers at the start of December were 2,725,067 tons, off 9 per cent from the 3,003,601 tons reported at the beginning of November.

Pig Iron . . .

Pig Iron Prices, Page 117

Foundry demand for merchant iron is spotty, with melters gearing purchases closely to actual needs. Foundries are fairly active, but some have idle capacity. Malleable shops are operating at a relatively good rate; gray iron shops, at a fair rate; and steel casting shops at an uneven rate.

The merchant iron trade in the Buffalo area expects a noticable pickup in the spring, especially after resumption of navigation on the Great Lakes. Large tonnages are scheduled to move on the waterway in early stages of navigation.

Effective Mar. 5, the New Haven Railroad will lower the commodity rate on pig iron shipments from

(*Please turn to Page* 127)

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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Feb. 17, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Feb. 17	$39.67
Feb. 10	41.50
Jan. Avg.	41.92
Feb. 1959	42.58
Feb. 1955	36.79

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*40.00-41.00*
No. 2 heavy melting	*34.00-35.00*
No. 1 dealer bundles	*40.00-41.00*
No. 2 bundles	*27.00-28.00*
No. 1 busheling	*40.00-41.00*
No. 1 factory bundles	*48.00-49.00*
Machine shop turnings	*22.00-23.00*
Mixed borings, turnings	*22.00-23.00*
Short turnings	30.00-31.00
Cast iron borings	30.00-31.00
Cut structurals:	
2 ft and under	*48.00-49.00*
3 ft and under	*47.00-48.00*
Heavy turnings	35.00-36.00
Punchings & plate scrap	*52.00-53.00*
Electric furnace bundles	*49.00-50.00*

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	46.00-47.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	*46.00-47.00*
Rails, 2 ft and under	62.00-63.00
Rails, 18 in. and under	63.00-64.00
Random rails	*58.00-59.00*
Angles, splice bars	*53.00-54.00*
Railroad specialties	*55.00-56.00*
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles & solids	*225.00-230.00*
18-8 turnings	120.00-125.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	*40.00-41.00*
No. 1 hvy melt., dealer	*36.00-37.00*
No. 2 hvy melting	*33.00-34.00*
No. 1 factory bundles	*41.00-42.00*
No. 1 dealer bundles	*37.00-38.00*
No. 2 bundles	*24.00-25.00*
No. 1 busheling, indus.	*40.00-41.00*
No. 1 busheling, dealer	*36.00-37.00*
Machine shop turnings	*19.00-20.00*
Mixed borings, turnings	*21.00-22.00*
Shovel turnings	*21.00-22.00*
Cast iron borings	*21.00-22.00*
Cut structurals, 3 ft	*46.00-47.00*
Punchings & plate scrap	*48.00-49.00*

Cast Iron Grades

No. 1 cupola	*50.00-51.00*
Stove plate	*47.00-48.00*
Unstripped motor blocks	*43.00-44.00*
Clean auto cast	*47.00-58.00*
Drop broken machinery	*47.00-58.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*39.00-40.00*
R.R. malleable	*59.00-60.00*
Rails, 2 ft and under	*56.00-57.00*
Rails, 18 in. and under	*57.00-58.00*
Angles, splice bars	*52.00-53.00*
Axles	*57.00-58.00*
Rails, rerolling	*61.00-62.00*

Stainless Steel Scrap

18-8 bundles, solids	220.00-225.00
18-8 turnings	115.00-120.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*34.00-35.00*
No. 2 heavy melting	*20.00-21.00*
No. 1 bundles	*37.00-38.00*
No. 2 bundles	*18.00-19.00*
No. 1 busheling	*33.00-34.00*
Machine shop turnings	*12.00-13.00*
Mixed borings, turnings	*11.00-12.00*
Shovel turnings	*10.00-11.00*

Cast Iron Grades

No. 1 cupola	*43.00-44.00*
Stove plate	*37.00-38.00*
Heavy breakable	*37.00-38.00*
Unstripped motor blocks	*29.00-30.00*
Charging box cast	*37.00-38.00*
Clean auto cast	*50.00-51.00*

CLEVELAND

No. 1 heavy melting	40.00-41.00
No. 2 heavy melting	30.00-31.00
No. 1 factory bundles	44.00-45.00
No. 1 bundles	40.00-41.00
No. 2 bundles	25.00-26.00
No. 1 busheling	40.00-41.00
Machine shop turnings	13.00-14.00
Shovel turnings	18.00-19.00
Mixed borings, turnings	18.00-19.00
Cast iron borings	18.00-19.00
Cut foundry steel	41.00-42.00
Cut structurals, plate 2 ft and under	48.00-49.00
Low phos. punchings & plate	42.00-43.00
Alloy free, short shovel turnings	20.00-21.00
Electric furnace bundles	42.00-43.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Charging box cast	39.00-40.00
Heavy breakable cast	39.00-40.00
Stove plate	47.00-48.00
Unstripped motor blocks	37.00-38.00
Brake shoes	39.00-40.00
Clean auto cast	56.00-57.00
Burnt cast	47.00-48.00
Drop broken machinery	54.00-55.00

Railroad Scrap

R.R. malleable	62.00-63.00
Rails, 2 ft and under	61.00-62.00
Rails, 18 in. and under	62.00-63.00
Rails, random lengths	55.00-56.00
Cast steel	51.00-52.00
No. 1 railroad cast	57.00-58.00
Railroad specialties	54.00-55.00
Angles, splice bars	54.00-55.00
Rails, rerolling	71.00-72.00

Stainless Steel (Brokers' buying prices: f.o.b. shipping point)

18-8 bundles, solids	210.00-215.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	115.00-120.00
430 turnings	45.00-55.00

YOUNGSTOWN

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	33.00-34.00
No. 1 busheling	43.00-44.00
No. 1 bundles	44.00-45.00
No. 2 bundles	28.00-29.00
Machine shop turnings	16.00-17.00
Shovel turnings	21.00-22.00
Cast iron borings	21.00-22.00
Low phos.	45.00-46.00
Electric furnace bundles	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00

BUFFALO

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	36.00-37.00
No. 2 bundles	27.00-28.00
No. 1 busheling	36.00-37.00
Shovel turnings	24.00-25.00
Machine shop turnings	20.00-21.00
Cast iron borings	22.00-23.00
Low phos. structurals and plate, 2 ft and under	45.00-46.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.00-48.00
No. 1 machinery	49.00-50.00

Railroad Scrap

Rails, random lengths	47.00-48.00
Rails, 3 ft and under	53.00-54.00
Railroad specialties	45.00-46.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*36.00-37.00*
No. 2 heavy melting	31.00-32.00
No. 1 bundles	*36.00-37.00*
No. 2 bundles	*25.00-26.00*
No. 1 busheling	*36.00-37.00*
Machine shop turnings	*19.00-20.00*
Mixed borings, turnings	*19.00-20.00*
Shovel turnings	22.00-23.00
Cast iron borings	21.00-22.00
Low phos. 18 in.	*48.00-49.00*

Cast Iron Grades

No. 1 cupola	*47.00-48.00*
Heavy breakable cast	*39.00-40.00*
Charging box cast	*40.00-41.00*
Drop broken machinery	*55.00-56.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*41.00-42.00*
Rails, 18 in. and under	60.00-61.00
Rails, random lengths	51.00-52.00

PHILADELPHIA

No. 1 heavy melting	*40.00*
No. 2 heavy melting	*35.00*
No. 1 bundles	*44.00*
No. 2 bundles	25.00
No. 1 busheling	45.00
Electric furnace bundles	*46.00*
Mixed borings, turnings	23.00†
Shovel turnings	26.00-27.00
Machine shop turnings	23.00
Heavy turnings	*31.00-34.00*
Structurals & plates	*46.00-48.00*
Couplers, springs, wheels	*49.00*
Rail crops, 2 ft & under	*66.00-67.00*

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable cast	47.00
Drop broken machinery	*53.00*
Malleable	66.00†

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	36.00-37.00
No. 2 bundles	20.00-21.00
Machine shop turnings	8.00-10.00
Mixed borings, turnings	12.00-13.00
Shovel turnings	13.00-14.00
Low phos. structurals & plates	39.00-40.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	37.00-38.00

Stainless Steel

18-8 sheets, clips, solids	200.00-205.00
18-8 borings, turnings	90.00-95.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	25.50-26.50
No. 1 bundles	35.00-36.00
No. 1 busheling	35.00-36.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
No. 1 cast	39.00-40.00
Mixed cupola cast	36.00-36.50
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	36.00-37.00
No. 2 bundles	25.00-26.00
No. 1 busheling	41.00-42.00
Cast iron borings	14.00-15.00
Machine shop turnings	24.00-25.00
Shovel turnings	25.00-26.00
Bar crops and plate	44.00-45.00
Structurals & plate	44.00-45.00
Electric furnace bundles	41.00-42.00
Electric furnace:	
3 ft and under	*38.00-39.00*
2 ft and under	39.00-40.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	53.00-54.00
Charging box cast	29.00-30.00
Unstripped motor blocks	42.00-43.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 18 in. and under	*56.00-57.00*
Rails, rerolling	61.00-62.00
Rails, random lengths	*52.00-53.00*
Angles, splice bars	49.00-50.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 1 bundles	42.00
No. 2 bundles	*25.00*
No. 1 busheling	42.00
Machine shop turnings	*19.00*
Shovel turnings	*21.00*

Cast Iron Grades

No. 1 cupola	*52.00*
Charging box cast	*45.00*
Heavy breakable cast	*43.00*
Unstripped motor blocks	*44.00*
Clean auto cast	*55.00*
Stove plate	*44.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*42.00*
Rails, 18 in. and under	*52.00*
Rails, random lengths	50.00
Rails, rerolling	61.00
Angles, splice bars	*49.00*

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	39.00
No. 2 heavy melting	36.00
No. 1 bundles	39.00
No. 2 bundles	25.00
Machine shop turnings	19.00-20.00
Shovel turnings	23.00
Low phos. plate & structurals	*45.00-46.00†*

Cast Iron Grades

No. 1 cupola	44.00-45.00†
Heavy breakable	31.00†
Foundry malleable	40.00-41.00†
Unstripped motor blocks	35.50-36.50†

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

LOS ANGELES

(Brokers' buying prices)

No. 1 heavy melting	38.00
No. 2 heavy melting	35.00
No. 1 bundles	*34.00*
No. 2 bundles	*21.00*
Machine shop turnings	19.00
Shovel turnings	18.00
Cast iron borings	18.00
Cut structurals and plate 1 ft and under	48.00

Cast Iron Grades

No. 1 cupola	*46.00-47.00*

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

PORTLAND, OREG.

No. 1 heavy melting	37.00
No. 2 heavy melting	34.00
No. 1 bundles	34.00
No. 2 bundles	23.00
Shovel turnings	22.00
Electric furnace bundles	44.00-45.00

Cast Iron Grades

No. 1 cupola	40.00-42.00
Heavy breakable	35.00
Unstripped motor blocks	31.00
Stove plate	25.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 1 bundles	34.00
No. 2 bundles	20.00-22.00
Machine shop turnings	17.00†
Mixed borings, turnings	17.00†
Electric furnace No. 1	45.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable cast	30.00
Unstripped motor blocks	25.00
Stove plate (f.o.b. plant)	21.00†

SAN FRANCISCO

No. 1 heavy melting	38.00
No. 2 heavy melting	34.00
No. 1 bundles	34.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Shovel turnings	16.00
Cut structurals, 3 ft	44.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

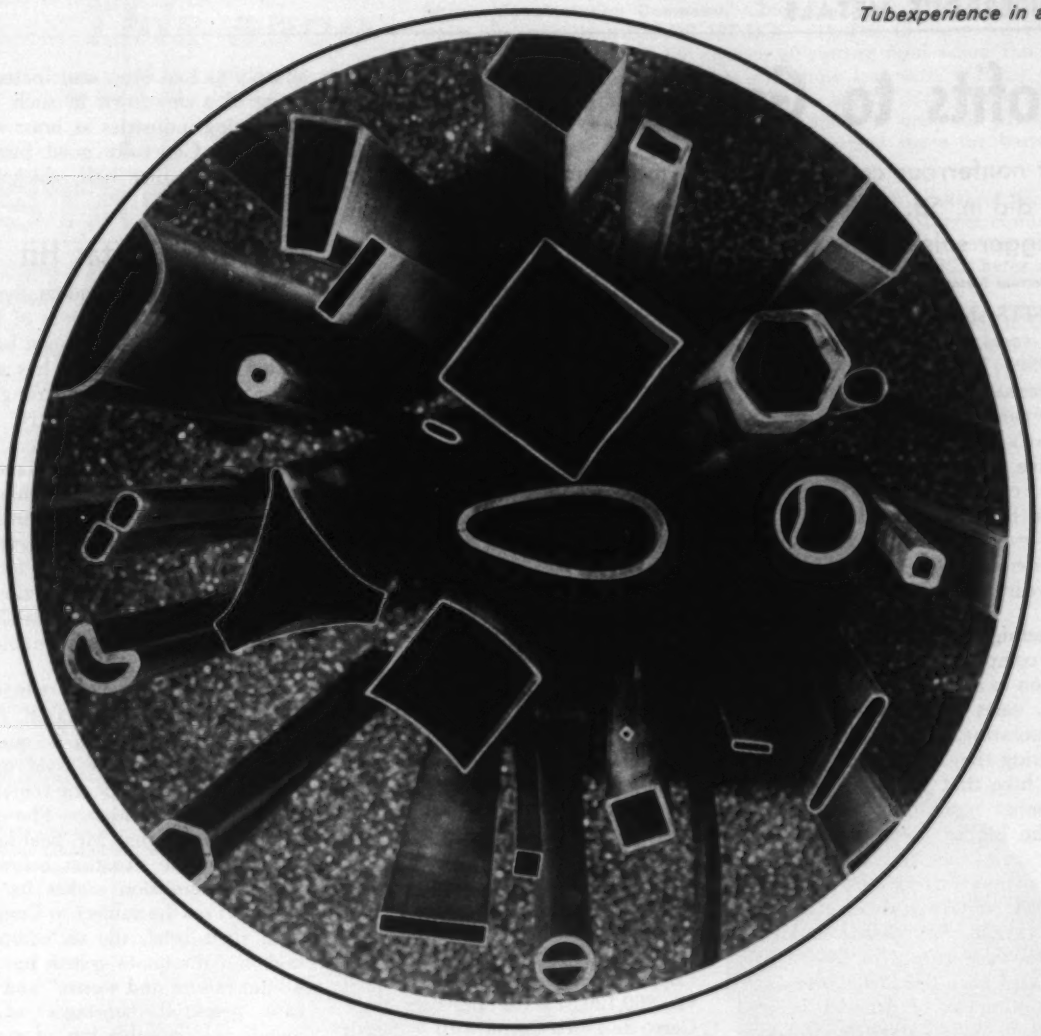
(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory:	13.00
Prepared	32.25
Unprepared	26.25
Shovel turnings	17.00

Cast Iron Grades‡

No. 1 machinery cast	46.50-48.00

†Nominal.
‡F.o.b. Hamilton, Ont.



Tubing shaped to New Ideas

Many people think of tubing only in its most common form—round. As design engineers and buyers, you know it can be produced economically in a large variety of unusual shapes. But have you ever seen the particular shapes illustrated on this page? They are samples from production runs formed to extremely close tolerances to satisfy specific design requirements. End uses include Bourdon springs, surgical instruments, batons, aircraft structural parts, gun drill shanks, radar screens, door latches, electrical equipment, antennas, golf club shafts, fishing rods and bushings. However, we don't know where all the different shapes are used, or why they are required. But our ability to form them saves manufacturers in many industries considerable time and money in the fabrication of their products.

Superior regularly produces shaped tubing in many analyses of stainless steel, carbon and alloy steels, nickel and nickel alloys, and glass sealing alloys. Also in titanium and beryllium copper. Shaped tubing is generally supplied in the as-formed temper (annealed before shaping), but many special tempers can be supplied.

We can probably supply your requirements at low cost, in good time. Data Memorandum No. 17 gives full details about Superior Shaped Tubing. Write for a copy today. Superior Tube Company, 2005 Germantown Ave., Norristown, Pa.

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010 in. to 5/8 in. OD—certain analyses in light walls up to 2½ in. OD

West Coast: Pacific Tube Company, Los Angeles, California • FIRST STEEL TUBE MILL IN THE WEST

Profits to Go Up in '60

Most nonferrous companies made more money in 1959 than they did in '58. This year, they'll do even better on the basis of bigger sales and generally higher price levels

Nonferrous Metal Prices, Pages 126 & 127

PROFITS showed a strong and, in some cases, spectacular resurgence in 1959. They should gain again this year, despite higher labor costs. Some companies may post records.

Here's why: Although sales may not live up to the bullish forecasts made earlier in the year, they should be better than 1959's. And price levels throughout 1960 should be generally higher than they were last year.

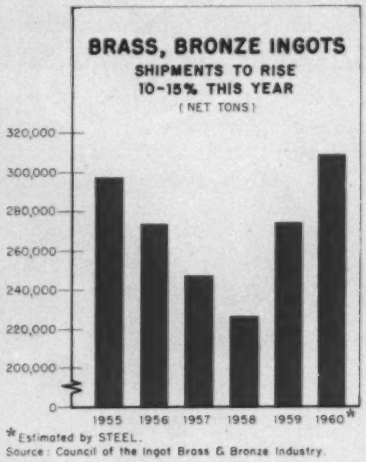
• **Leading Contender**—The aluminum companies appear in the best position to reap all-time high profits. True, sales have been somewhat disappointing, but the smart money is betting they'll pick up soon. The price hike that went into effect in December more than compensated for the higher labor charges—and don't rule out the strong possibility that quotations will be bumped sometime this year.

Last year, Reynolds Metals Co. had record earnings of $44,761,000 compared with $39,364,000 in 1958. Aluminum Co. of America boosted profits to $55,570,854 vs. $42,885,230 in 1958. Of the Big Three, only Kaiser Aluminum & Chemical Corp. suffered a slight dip, earning $22,328,000 compared with $25,232,000 in 1958.

• **Lead-Zinc Rebound**—Despite the steel strike and labor walkouts of its own, the lead-zinc industry fared pretty well in 1959. For example, St. Joseph Lead Co. earned $6,263,076 compared with $3,986,880 the previous year; the American Zinc, Lead & Smelting Co., $1,802,265 vs. $1,136,797; and the Bunker Hill Co. climbed out of the red to post earnings of $322,458 after losing more than $2 million in 1958.

This year, market forecasters are talking in terms of a 15 to 20 per cent sales jump for zinc and a gain of 4 to 5 per cent for lead.

• **Strike Hurt Copper**—The strike which paralyzed the bulk of the domestic copper industry over most of the second half ate away at profits built up during a record shattering first half. Phelps Dodge Corp. earned $34,574,801 compared with $38,006,538 in 1958. The nation's largest producer, Kennecott Copper Corp., reported $57,326,379 vs. $60,120,573 the previous year. Cerro de Pasco Corp., with its South American production unaffected by the U. S. strike, boosted profits by 76 per cent to $9,100,000 compared with $5,156,763 in 1958.



*Estimated by STEEL.
Source: Council of the Ingot Brass & Bronze Industry.

Now that the bulk of the strikes are settled, deliveries will begin to mount, though probably not as sharply as had been anticipated because of a slowdown in such large consuming industries as brass mills. Expected: Generally good business through the first half, slackoff in the second.

Lead-Zinc Quotas Hit

The controversial quota system, which limits the quantities of lead-zinc ores and metal that can be imported into this country, has again come under fire from a strong segment of the U. S. industry.

The latest blast came in a brief filed with the U. S. Tariff Commission by six domestic companies requesting that body ". . . to find and report to the Senate that quotas are not a suitable instrument for the control of trade in lead and zinc and that any increased protection should be in the form of a reasonable increase in specific duties."

The fireworks started when Interior Secretary Fred Seaton, in an off-the-cuff answer to a question at a press conference, said quotas would be in effect for the remainder of this year at least. The reply led to charges that Mr. Seaton was prejudging the situation before the Tariff Commission makes its Mar. 31 report on the subject to Congress.

In their brief, the six companies said that the quota system has been a "flat failure and worse," and forecast potential shortages of the metals . . . possible loss of markets to substitute materials . . . certain discrimination against the smaller independent smelting companies . . . great market confusion . . . and continued alienation of friendly nations . . . unless quotas are repealed.

NONFERROUS PRICE RECORD

	Feb. 17 Price	Last Change	Previous Price	Jan. Avg	Dec. Avg	Feb., 1959 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	25.300	24.700
Copper	33.00–35.00	Dec. 23, 1959	33.00	34.000	33.269	30.159
Lead	11.80	Dec. 21, 1959	12.30	11.800	12.338	11.368
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	102.00	Feb. 17, 1960	101.875	99.875	99.130	102.364
Zinc	13.00	Jan. 8, 1960	12.50	12.917	12.500	11.409

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig 99.8%, Velasco, Tex.

This shop cuts costs by using STANICUT *Oil 137 BCS*

Machines seven metals, one plastic with this one cutting fluid

Shank Manufacturing Company, Chicago, cuts production costs three ways by using STANICUT Oil 137 BCS. (1) The 15 Warner & Swasey Lathes are never down for change of cutting fluid when the metal being worked is changed. There's no time lost with shutting down, cleaning up and changing oil. (2) There are no losses from the use of the wrong cutting fluid. (3) Floor space is used for productive machinery instead of being tied up as storage space for barrels of different cutting fluids.

Titanium, brass, alloy steel, aluminum and seven grades of Stainless plus Teflon plastic are all worked on the machines. Latest equipment, a reputation for good work, experienced operators and on-time delivery keep business coming to Shank. STANICUT Oil 137 BCS helps Shank hold down manufacturing costs.

Does cutting costs with a cutting fluid interest you? Let one of Standard Oil's experienced lubrication specialists show you how STANICUT Oil 137 BCS can do it. Call the Standard Oil office nearest you in any of the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

You expect more from **STANDARD** *and you get it!*

Frank Kruppe, Shank president (left) shows Hank Krueger of Standard Oil one of the pieces Shank Mfg. produces. Hank Krueger provides Shank plant with technical service on cutting fluids. Hank has the experience for this work. He's been doing it for six years. He has an engineering degree from Illinois Institute of Technology and has completed Standard's Sales Engineering School.

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 30.70; No. 214, 31.50; No. 356, 28.60, 30 lb ingots; 10 lb ingots, add 0.4 cent per lb; 6 lb ingots, add 0.6 cent per lb.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 35.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb, f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $210-212 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82.85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $45-50 per troy oz.

Selenium: $7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom.; sheet, $55 per lb nom.

Tellurium: $3.00 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 101.25; prompt, 101.00.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.50-4.25.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 14.25; special high grade, 14.50 deld. Diecasting alloy ingot No. 3, 16.50; No. 2, 17.00; No. 5, 16.75 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.25-29.00; No. 12 foundry alloy (No. 2 grade), 25.00-25.25; 5% silicon alloy, 0.60 Cu max., 26.25; 13 alloy, 0.60 Cu max., 26.25; 195 al'oy, 28.00-28.75; 108 alloy, 25.50-25.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.50; grade 2, 24.25; grade 3, 23.25; grade 4, 22.75.

Brass Ingot: Red brass, No. 115, 30.75; tin bronze, No. 225, 41.50; No. 245, 36.00; high-leaded tin bronze, No. 305, 35.25; No. 1 yellow, No. 405, 24.75; manganese bronze, No. 421, 29.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $4.00-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base, f.o.b. customer custody.

Thickness Range (in.)	Widths (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.00
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	44.60	49.40
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft lengths.

Diam. (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft. lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft. lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-66.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-121.00

MAGNESIUM

Sheets and Plate: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 25.75-26.25; No. 2 heavy copper and wire, 22.75-23.25; light copper, 21.25-21.75; No. 1 composition red brass, 18.75-19.25; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 33.00c)		
	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	57.13b	54.86c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	20.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	26.875	26.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 17.25-17.50; new brass clippings, 15.50-16.00; light brass, 12.00-12.25; heavy yellow brass, 13.25-13.75; new brass rod ends, 13.25-13.75; auto radiators, unsweated, 14.75-15.25; cocks and faucets, 15.25-15.75; brass pipe, 15.25-15.75.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 7.25-7.75; mixed babbitt, 9.50-10.00.

Monel: Clippings, 28.00-29.00; old sheets, 24.00-26.00; turnings, 20.00-22.00; rods, 28.00-29.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 39.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 4.50-5.00; new diecast scrap, 4.25-4.50; old diecast scrap, 2.75-3.00.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.50-15.00; mixed high copper clips, 12.50-13.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.75-13.25; clean borings and turnings, 10.00-10.50; segregated low copper clips, 16.75-17.25; segregated high copper clips, 16.00-16.50; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.50-16.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 12.00-12.25; clean borings and turnings, 11.00-11.50; segregated low copper clips, 16.00-16.50; segregated high copper clips, 15.00-15.50; mixed low copper clips, 15.50-16.00; mixed high copper clips, 14.50-15.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivery refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 27.50; No. 2 heavy copper and wire, 25.75; light copper, 23.50; refinery brass (60% copper) dry copper content, 24.00.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.50; No. 2 heavy copper and wire, 25.75; light copper, 23.50; No. 1 composition borings, 22.00; No. 1 composition solids, 22.50; heavy yellow brass solids, 16.00; yellow brass turnings, 15.00; radiators, 17.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50.

Copper: Flat-rolled, 50.04; oval, 48.00; 5000-10,000 lb; electrodeposited, 42.50; 2000-5000 lb lots; cast, 45.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 120.50; 200-499 lb, 119.00; 500-999 lb, 118.50; 1000 lb or more, 118.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.40 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 79.50; 100-600 lb, 70.20; 700-1900 lb, 67.40; 2000-9900 lb, 65.60; 10,000 lb or more, 64.20.

Stannous Chloride (Anhydrous): 25 lb, 155.00; 100 lb, 150.10; 400 lb, 147.70; 800-19,900 lb, 106.80; 20,000 lb or more, 100.70.

Stannous Sulphate: Less than 50 lb, 140.20; 50 lb, 110.20; 100-1900 lb, 108.20; 2000 lb or more, 106.20.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(Concluded from Page 121)

Beacon, N. Y., to Connecticut, Rhode Island, and western Massachusetts to $5.10 from $5.40 per gross ton; to Boston and eastern Massachusetts, to $6.47 from $6.77; and to Hopedale, Mass, to $6.73 from $7.03.

1959 Pig Iron Output Broken Down by Grades

Pig iron production (excluding ferroalloys) in 1959 totaled 60,322,426 net tons, reports the American Iron & Steel Institute. Breakdown by grades: Low phos, intermediate low phos, and bessemer, 3,471,683 tons; basic, 52,150,939 tons; malleable and silvery, 2,810,359 tons; foundry, 1,889,445 tons.

Shipments of iron by the furnaces for other than their own use (merchant tonnage) amounted to 5,398,006 net tons during the year. Broken down by grades: Low phos, intermediate low phos, and bessemer, 536,688 tons; basic, 912,407 tons; malleable and silvery, 2,607,339; foundry, 1,341,572.

Last year, 1,082,649 net tons went to steel ingot producers (open hearth, bessemer, and electric fur-

CLASSIFIED ADVERTISING

Representatives Wanted

SALES REPRESENTATIVE—Long established producer of metal abrasives requires Manufacturers agent for Ontario, Canada area. Also representation for Philadelphia-New Jersey area. Prefer individuals now contacting foundries, forge, steel & heat treating plants. Address: Reply to Box 825, STEEL, Penton Bldg., Cleveland 13, Ohio. State experience and present activity. Personal interview will be arranged.

Help Wanted

STRUCTURAL DRAFTING HEAD: Structural steel fabricator desires experienced man to head medium-size drafting department. Must be able to lead and train men. Graduate engineer desirable, but not absolutely essential. This is an excellent and permanent position with an active and growing company in a growing community. Salary open. Profit sharing, hospitalization, other benefits. Fargo Foundry Company, Fargo, North Dakota.

FOUNDRY METALLURGIST—Modern, well established steel and gray iron foundry, located in Rochester, New York, has immediate opening for a metallurgist. Must be capable of taking complete charge of metallurgy and melting department, operating two electric furnaces of one-, and two-ton capacity. The Company offers liberal benefits, including a profit-sharing plan. Please provide complete background in first letter, including references and salary desired. Reply Box 826, STEEL, Penton Bldg., Cleveland 13, Ohio.

SALES ENGINEER—For east coast manufacturer of stainless steel pipe and tubing. Some engineering schooling desired. To cover west coast states. Salary plus incentive, career and pension opp. Submit complete resume and salary requirements. Reply Box 830, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

STEEL FABRICATION; Graduate Engineer 25 years in Steel Fabrication, Structural and Plate, Engineering, Estimating, Production Manager. Buildings and Bridges. Reply Box 831, STEEL, Penton Bldg., Cleveland 13, Ohio.

WANT TO BUY

Steel By-Products Discs

2" to 2½" Dia. .060 to .125
4½" Dia. .060 to .125
6½" to 10" Dia. .060 to .125
11" to 12½" Dia. .085 to .095
Hot or Cold Rolled

Keystone Lamp Mfg. Corp.
Purchasing Department
Tel. Slatington, Pa. PO 7-3821

MACHINERY WANTED

NEED MOTOR GENERATOR SET TO GENERATE 2-300 HORSE POWER IN 230 VOLTS D. C.
CALL OR WIRE IF INTERESTED.
STEEL WAREHOUSE CO., Inc.
Tucker Drive South Bend, Indiana
Phone ATlantic 7-6511

MORT CLARK'S **GALV-WELD** ALLOY ORIGINAL & GENUINE

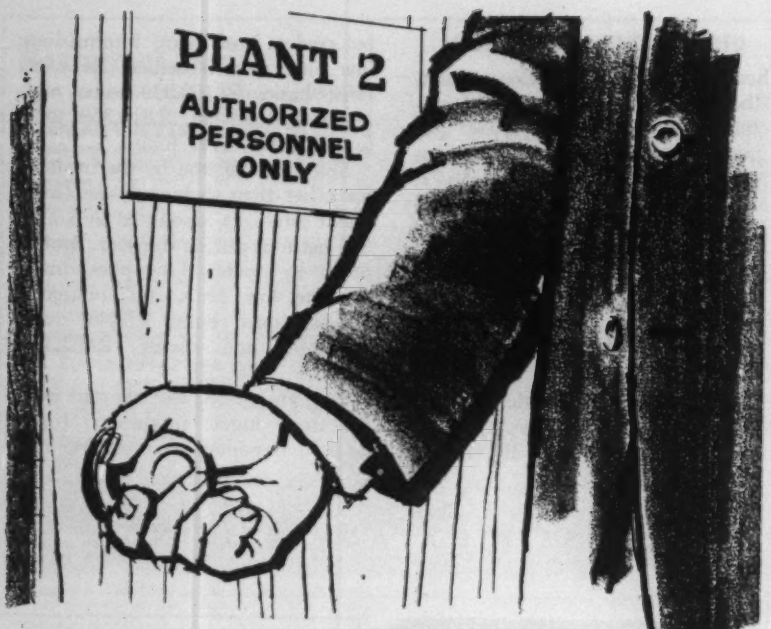
Stops corrosion at welds such as rust through ornamental iron paint. REGALVANIZES weld-burned galvanized joints. REPAIRS skips, abrasions. EASILY APPLIED. Makes every welder a job galvanizer. Free sample. GALV-WELD PRODUCTS, Dept. S-2, P.O. Box 1303, Bradenton, Florida.

STRUCTURAL STEEL FABRICATING PLANT
For Sale or Lease

In Central California in midst of great industrial expansion. 250 Ton Monthly Capacity One Shift. $107,000 including real estate. Suitable 2 or 3 men.

Box 832, STEEL
Penton Bldg. Cleveland 13, Ohio

BERRY BEARING COMPANY
Bearing Headquarters Since 1920
Phone: DAnube 6-6800
2633 S. Michigan Ave. • Chicago 16, Ill.



Would you let this salesman talk to your plant people?

He represents Snap-on Tools Corporation — home office, Kenosha, Wisconsin. He sells hand tools for production and maintenance — items like impact socket wrenches and shanks for high-speed power assembly, mechanics' wrenches and tools for hand assembly. Far more important, he brings cost-saving *ideas* on tool use. For example:

He will check your production line — point out any areas where tool changes could save time, cut costs.

On problem jobs, such as close-quarter work, hard-to-reach fittings, he can recommend special tools, refer idea sketches to SNAP-ON® design engineers. Often, however, among its over 4,000 items, SNAP-ON already makes a tool that fits your needs exactly.

Before a maintenance shutdown, he will go over equipment to be serviced with your maintenance man, then check your tools and make recommendations. Properly tooled-up at the start, you eliminate costly repair delays.

If your customers require tools in the operation of your product, the SNAP-ON representative can make up special tool kits to go out with each unit you sell.

Most important, the SNAP-ON sales engineer is *qualified* by training and experience to do all these things — and more. Tools are his only business. He is a specialist in daily contact with a wide variety of tool problems.

So, would you let *this* salesman talk to *your* plant people? In companies that have, the SNAP-ON tool specialist is a welcome member of the plant team. Contact your nearest SNAP-ON branch or write us.

FOR ALL INDUSTRY

SNAP-ON TOOLS

8121-B 28th AVENUE • KENOSHA, WISCONSIN

naces), including shipments to independent ingot mold producers. All other consumers received 4,315,357 tons.

Blast furnace operations averaged 64.2 per cent of capacity during 1959.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 115

Rates on quantity shipments of certain iron and steel bolts between New York and Chicago have been reduced 31 per cent by Lifschultz Fast Freight, New York. The new rate, applying to 32,000 lb or more, is $1.07 per 100 lb vs. $1.56 formerly. The new rate covers iron and steel bolts which are plain, galvanized, japanned, painted, tinned, or coated with brass, bronze, copper, lead, zinc, or cadmium.

Refractories . . .

Refractories Prices, Page 118

Machining charges on six brands of lightweight insulating firebrick have been reduced "as much as 48 per cent" by Babcock & Wilcox Co., New York. The standard shapes are commonly used in furnace construction in the steelmaking, metalworking, ceramic, and chemical processing industries. They include arches, wedges, keys, necks, and feather edges.

Machining charge reductions per 1000 firebrick range from $9, or 37 per cent, in one series, to $23, or 48 per cent, in another.

GE Reduces Prices 83 Per Cent on Tunnel Diodes

General Electric Co., Schenectady, N. Y., in starting factory production of germanium tunnel diodes, announced price reductions of 83 per cent. The new prices: $10 and $12.50 each. Previous quotations: $60 and $75.

Sylvania Lowers Diodes

Sylvania Electric Products Inc., a subsidiary of General Telephone & Electronics Corp., New York, has reduced prices 10 to 30 per cent on its Micro-Min diodes. Hermetically sealed in miniature glass envelopes, they are used in the miniaturization of radar and microwave equipment.

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Coming Feb. 29

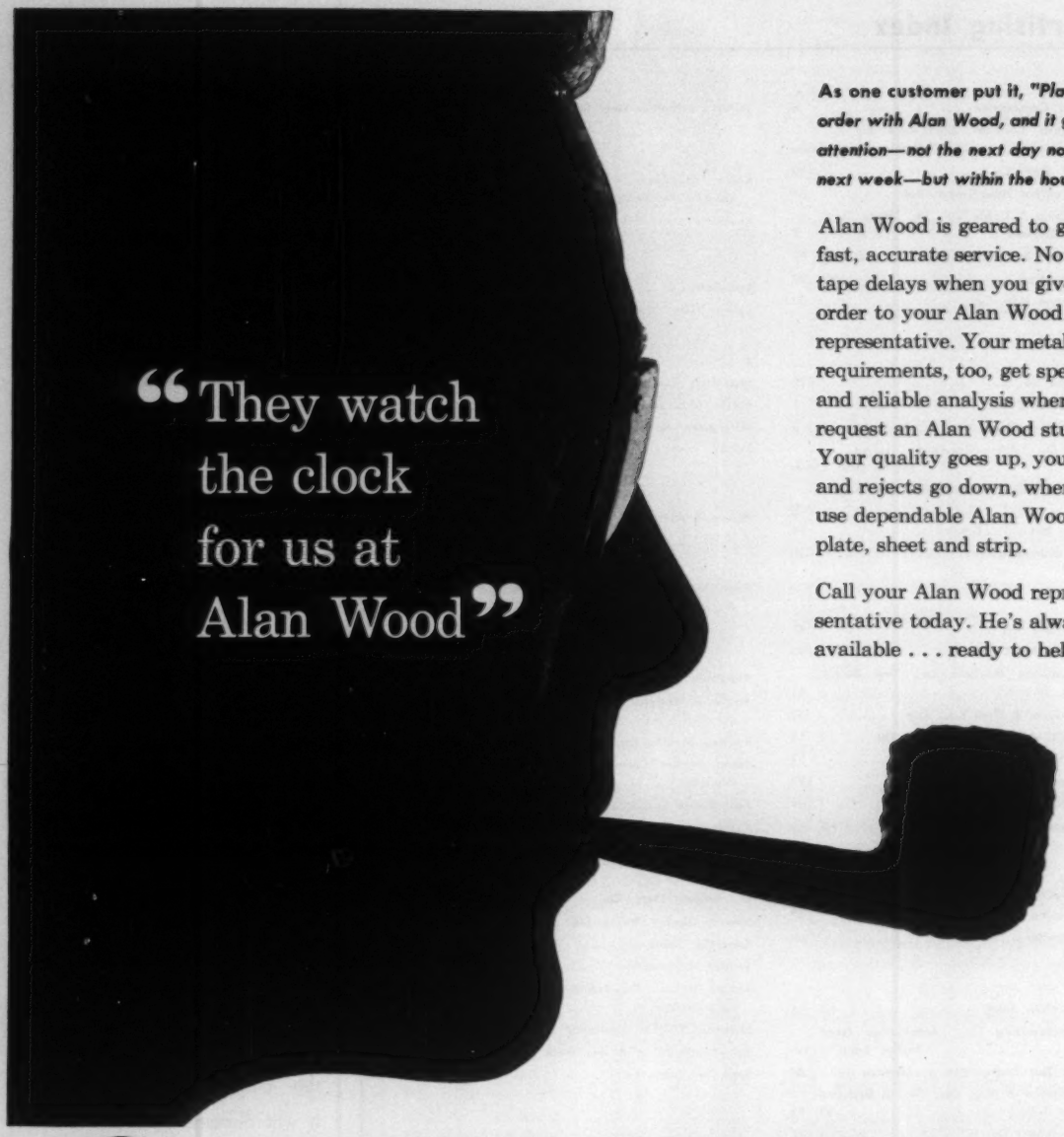
IN

STEEL

Get Set for The Shock of Thermoelectricity

This technical development will obsolete some present products, open new markets, shift others. It will challenge the designer's imagination. It will demand new production processes, new materials, new technology. It will pave the way for new standards of reliability and efficiency.

See STEEL next week for how it will benefit you.



As one customer put it, *"Place an order with Alan Wood, and it gets attention—not the next day nor the next week—but within the hour!"*

Alan Wood is geared to give you fast, accurate service. No red tape delays when you give an order to your Alan Wood representative. Your metallurgical requirements, too, get speedy and reliable analysis when you request an Alan Wood study. Your quality goes up, your costs and rejects go down, when you use dependable Alan Wood plate, sheet and strip.

Call your Alan Wood representative today. He's always available . . . ready to help.

ALAN WOOD STEEL COMPANY

Conshohocken, Pa. • **STEEL PRODUCERS WITH THE CUSTOMER IN MIND**

DISTRICT OFFICES AND REPRESENTATIVES: Philadelphia • New York • Los Angeles • Boston • Atlanta
Cincinnati • Cleveland • Detroit • Houston • Pittsburgh • Richmond • St. Paul • San Francisco • Seattle
Montreal, Toronto and Vancouver, Canada: A. C. Leslie & Co., Limited

What makes the difference between one galvanizing line and another? How can you save money on the purchase of a Continuous Galvanizing Line? What are the different components that must be considered in the designing of a line?

Aetna-Standard answers these and other questions in this new booklet on Continuous Galvanizing Lines. Other information includes information on the number of lines operating in the world; and pictures of different components of Continuous Galvanizing Lines.

A copy will be mailed promptly upon receipt of your request. BLAW-KNOX COMPANY, Aetna-Standard Division, Pittsburgh, Pennsylvania.

BLAW-KNOX

Aetna-Standard Division
BLAW-KNOX

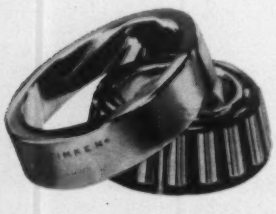
BLAW-KNOX

THE WORLD'S LEADING DESIGNER AND BUILDER OF CONTINUOUS GALVANIZING LINES

Aetna-Standard Division
BLAW-KNOX

THERE are two big reasons why the trade-mark "Timken" guarantees top bearing value. 1.) It assures you of uniform high quality and performance. From the steel right through to final inspection, Timken® bearings are made to the industry's most exacting specifications. 2.) You're assured of the finest bearing service available.

"Timken" is the registered trade-mark that identifies tapered roller bearings, fine alloy steels and removable rock bits made by The Timken Roller Bearing Company. For your guarantee of value, specify "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".



BETTER-NESS rolls on

TIMKEN®

tapered roller bearings